

INVESTIGATION OF THE PREVALENCE, RISK FACTORS AND IMPACT OF
MUSCULOSKELETAL DISORDERS AMONG NURSES AT KATUTURA
INTERMEDIATE HOSPITAL, KHOMAS REGION, NAMIBIA

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ABSTRACT

Musculoskeletal disorders (MSDs) are disorders affecting the musculoskeletal system of the human body and are common in nurses. This study aimed to investigate the prevalence, risk factors and impact of musculoskeletal disorders among nurses at Katutura Intermediate Hospital (KIH) in Namibia. A cross-sectional descriptive-analytic quantitative study was performed among 197 randomly selected nurses, using self-administered Standardized Nordic Musculoskeletal Questionnaire as data collection tool. The Epi Info™ software version 7, IBM SPSS Statistics 25, and Microsoft Excel 2010 were used for descriptive statistical analysis.

Results indicate that the prevalence rate of MSDs over a 12 month period, in any body part was 78.2%, with low back pain (64.0%), indicated as the main body part affected. Both work and non-work related risk factors are associated with the development of MSDs (p -value <0.05), but work-related risk factors such as extensive standing (84.8%), repetitive manual tasks (81.2%), and awkward posture (76.1%) were identified as the main risk factors contributing to the development of MSDs. The impact of MSDs among nurses indicates that nurses contribute poorly to hospital's output since they have to seek medical attention instead of attending to patients (72.1%), unnecessary money spending on medical consultations due to MSDs (66%), and difficulty sleeping (56.9%).

It could be concluded that MSDs exist among nurses at KIH, and its prevalence on different human body parts differs. It further has an impact on nurses' work and daily life. It is recommended that educational and awareness programme on MSDs to be introduced, and sustained with the aim of increasing knowledge about MSDs prevention,

including the prevention of exposure to work-related risk factors. Proper staffing and resting time be maintained to prevent understaffing and overworking that might expose nurses to work-related risk factors contributing to the development of MSDs.

Keywords: Musculoskeletal; Disorders; Nurses; Factors

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List of Abbreviations and/or Acronyms

BMI	-	Body Mass-Index
HIS	-	Health Information System
ILO	-	International Labour Organisation
KIH	-	Katutura Intermediate Hospital
MoHSS	-	Ministry of Health and Social services
MSDs	-	Musculoskeletal Disorders
M-SNMQ	-	The Standardized Nordic Musculoskeletal Questionnaire
RSIs	-	Repetitive Strain Injuries
WMSDs	-	Work-related Musculoskeletal Disorder

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Dedication

This study is dedicated to my responsible, helpful and lovely family.

Declarations

I, Ananias Akweetelela, hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

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CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

This chapter provides an overview of the study. This overview includes the background to the study, the problem statement, the purpose and objectives of the study and the significance of the study. The chapter also contains definitions of the concepts used in this study.

1.2 BACKGROUND OF THE STUDY

Musculoskeletal disorders (MSDs) were first discovered during the late 19th century among the industrial workers in Great Britain (9). Over decades high rates of workplace injuries related to MSDs were reported in both developed and developing countries (10). Currently MSDs are a serious global concern to many organisations, including industry, insurance and health care (11).

Musculoskeletal disorders (MSDs) are painful disorders, which are degenerative and inflammatory conditions that affect the peripheral nerves, neurovascular and musculoskeletal systems (1,2). These disorders, also called injuries, can specifically affect the human body's movement or musculoskeletal system such as muscles, tendons, ligaments, nerves, discs and blood vessels (3–7). In other words, the term musculoskeletal disorder denotes health problems of the locomotor apparatus, which is of muscles, tendons, the skeleton, cartilage, ligaments and nerves (8). The symptoms of MSDs are stiff joints, dull aches, swelling and recurrent pain (1,2).

MSDs usually occur when a muscle, tendon, nerve or joint is stressed and traumatized on a repeated basis for days, months or years, and those body tissues eventually become damaged (12). Musculoskeletal disorders include all forms of ill-health ranging from light, transitory disorders to irreversible, disabling injuries (8). MSDs problems are common and most prevalent in the nursing profession (13). Studies have shown that the prevalence rate of MSDs in nurses is usually high ranging between 60-95% (14–18). Low back pain is the most known, common, and identified most prevalent body part mostly affected by MSDs (9) .

The MSDs can either be caused by work-related or non-work related risk factors. MSDs are mostly work-related musculoskeletal disorder (WMSDs) (6,19). WMSDs are diseases related and/or aggravated by work that can affect the upper limb extremities, the lower back area, and the lower limbs (4,10,20). WMSDs can be defined by impairments of bodily structures such as muscles, joints, tendons, ligaments, nerves, bones and the localized blood circulation system, caused or aggravated primarily by work itself or by the work environment (21). Work related musculoskeletal disorders (WMSDs) are sometimes called repetitive strain injuries (RSIs), cumulative trauma disorders and overuse injuries (12).

There are two main groups of work-related (ergonomic) risk factors, namely physical and psychosocial risk factors. The psychosocial risk factors refer to job content and organisational characteristics risk factors (22). Physical risk factors include repetitive manual tasks, extensive sitting, extensive standing, awkward postures and manual handling of items, including patients handling.

Factors related to job content involves high workloads, tight deadlines, and lack of control of the work and working methods. Organisational characteristics on the other hand, deal with risk factors such as poor working relationships with supervisors and colleagues, financially demoralized, poor work/rest cycle and poor community support (23,24).

Non work-related musculoskeletal disorders are painful MSDs or injuries that occur as a results of employees being exposed and/ doing other work that are not related to their employment or profession. These kinds of MSDs occur as a result of employees exposed to individual-related risk factors. Individual-related risk factors comprise of demography as well as lifestyle factors (22,24–26). The demographic factors include gender, age and body mass index. Lifestyle factors relate to alcohol, smoking, exercise, sport, leisure activities, housekeeping work and other roles of the individual outside work places that might contribute to their development of MSDs (7,27).

Various studies were conducted worldwide to determine the impact of MSDs among various health care professionals (2,3,7,28). Studies conducted in Australia and Canada revealed that MSDs has serious social and economic impact to such an extent that prevention strategies need to be designed (6). Studies conducted in Egypt, Malasia and Nigeria indicated that MSDs lower the quality of workers' life and reduce their productivity (10,27). MSDs are the most expensive form of work disability, attributing to about 40% of all costs toward the treatment of work-related injuries (10). MSDs are considered to be multifactorial due to the interactions between various risk factors, which result in conditions that vary across different occupations (1). There are

differences in MSDs in developed and developing countries and within the two groups of countries due to socio-cultural differences (22).

MSDs are responsible for morbidity in many working populations. MSDs continue to be a major occupational health problem to both government agencies and the private industry work environment (10). MSDs are the most prevalent and the most common cause of disability among health workers worldwide and have become a common occupational health problem in the health care workers population (5). In health care, MSDs pose a major public health and socioeconomic problem among health workers worldwide (30). MSDs are reported to be the most common causes of disability and occupational health problems among health workers in most hospitals in many countries worldwide (23).

The nursing profession is regarded as the profession with a high prevalence of MSDs compared to other occupations (31). The nursing profession is a very demanding job, both physically and emotionally which make nurses more susceptible to WMSDs (30). Besides the physical demands of the job, the time spent working also increase the chance of the development of WMSDs' development. This is because the worker's physical work capacity decreases with age (21).

1.3 STATEMENT OF THE PROBLEM

Nurses working for Katutura Intermediate Hospital (KIH) are understaffed and overloaded with hospital work (32,33). Even though MSDs is also caused by individual-related risk factors, being understaffed and overworking could strongly lead to dangerous working conditions. Working while exposed to work-related risk factors,

leads to the development of MSDs among nurses, such as prolonged standing, sitting, applying repetitive movements, manual handling, and stress since nurses have to serve patients that are sometime more than the hospital's accommodating capacity (1).

There is a direct association between understaffing, work overload and the development of musculoskeletal disorders (34). MSDs are the most expensive form of work disability, attributing to about 40% of all costs toward the treatment of work-related injuries, and it has a high prevalence of 60% in developing countries, and 11% in developed countries (34). The impact of MSD results in nurses taking excess leave, quitting the profession, loss working time and loss of quality of life (5). This means that MSD leads to an increase in human and economic loss to health care institutions.

The Health Information System (HIS) department of KIH recorded a total of 13426 and 8635 individuals treated for MSDs in both outpatient and inpatient in 2015 and 2016 respectively (35). The HIS records do not specify how many of these individuals were nurses, since nurses were also recorded as patients.

Although the nursing profession is known to be at a high risk for MSDs, it is one of the least-studied occupations (10). Even if MSD has been studied internationally, there is still need for it to be studied locally. Hence, this study aimed to look at the MSDs affecting nurses working at Katutura Intermediate Hospital.

1.4 PURPOSE AND OBJECTIVES OF THE STUDY

The purpose of the study was to investigate the prevalence, risk factors and impact of musculoskeletal disorders among nurses at Katutura Intermediate Hospital in Khomas region in Namibia.

The specific objectives of the study were to:

- Determine and describe the prevalence of musculoskeletal disorders among nurses at Katutura Intermediate Hospital.
- Identify and determine the categories of risk factors that cause musculoskeletal disorders among nurses at Katutura Intermediate Hospital.
- Determine and describe the impact of musculoskeletal disorders among nurses at Katutura Intermediate Hospital.

1.5 SIGNIFICANCE OF THE STUDY

The study could provide baseline information on the prevalence, risk factors and impact of MSDs among nurses at KIH. The study findings and recommendations might assist the Ministry of Health and Social Services (MoHSS) to improve on and ensure the health and safety of nurses at work. The research findings might provide room for further studies in health service facilities in Namibia

1.6 DEFINITION OF KEY CONCEPTS

Introduction

The definition of terms is essential to ensure a common understanding of key concepts and terminology is shared between the dissertation author and his/her audiences. The following are the definition of concepts used in this study.

Prevalence: Prevalence is the proportion of a particular population found to be affected by a certain specific condition. Proportion is means a part/number considered in comparative relation to a whole (36).

Risk factors: Risk factors refer to the variables/conditions related with a lower likelihood of positive outcomes as well as the higher likelihood of possible negative or socially undesirable outcomes (37).

Impact: The term impact means a marked effect or influence of something to something (38).

Musculoskeletal disorders: Musculoskeletal is the scientific term that describe and/ specifically mean relating to or denoting the musculature and skeleton together (1,2). The musculoskeletal involved the components of muscular system and the skeletal system (8) The term disorder means the disruption of the systematic functioning. Musculoskeletal disorders refer to the chronic and acute conditions that involve the tendons, nerves, muscles, and supportive structures of the body and compromise their functions (3–7).

Nurses: Nurses refer to people who have completed a program of nursing education and are authorised by the approved regulatory authority(s) to practise nursing in their countries. For this study these nurses are registered by the Health Professions Councils of Namibia.

Nursing: Nursing is a profession that is responsible for attaining, maintaining and recovering optimal health and quality of life of individual, families and communities health under the health care sector.

1.7 SUMMARY

Musculoskeletal disorders (MSDs) are painful disorders, which are degenerative and inflammatory conditions that affect the musculoskeletal, peripheral nerves, and neurovascular systems. These conditions are most prevalent in the nursing profession, with their low back pain being the most prevalent affected body part. MSDs are caused by work-related and individual-related risk factors. The wards at KIH are understaffed with nurses and this leads to an overload of hospital work, which might put them at risk of being exposed to work-related risk factors that might contribute to work-related-musculoskeletal disorders' development. Thus, the study aimed at determining and describing the prevalence, risk factors, and impacts of MSDs among nurses at KIH.

The next chapter covers the literature review.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter covers what has already been written by other researchers on musculoskeletal disorders (MSDs) among nurses. Studies that addressed similar and or same issues as areas of interests as the one for this study will be discussed in this chapter. The review entails theories of previous studies and other researchers.

2.2 THEORIES OF MUSCULOSKELETAL DISORDERS

MSDs are painful disorders, which are degenerative and inflammatory conditions that affect the musculoskeletal, peripheral nerves, and neurovascular systems (1,2). These disorders, also called injuries, can specifically affect the human body's movement or musculoskeletal system such as muscles, tendons, ligaments, nerves, discs and blood vessels (3–7). There are several theories about causes of MSDs. The overexertion theory, cumulative load theory, multivariate interaction theory and differential fatigue theory are four theories that address the causes of MSDs.

2.2.1 Overexertion theory

The overexertion theory assumes that MSDs are caused by the amount of force exerted by the muscle in order to complete certain tasks. This means that MSDs might occur when the combined critical threshold for force, posture/motion and exposure time are exceeded (27).

Nursing is a very demanding job, which involves tasks of manual handling such as carrying, lifting, pulling or pushing. These job tasks require a certain amount of body efforts to complete the tasks. Hence handling patients is a risk factor to develop MSDs among nurses. MSDs due to overexertion was recorded to be four times higher among nurses than the average MSDs' prevalence rate among all private industries in Uganda (40). This supports the assumption that musculoskeletal disorders is caused by the amount of force exerted by muscle in order to complete a task (3).

2.2.2 Cumulative load theory

Cumulative load theory claims that MSDs can occur as a result of both repetitions of work tasks and/ or too much load bearing on the tissue and less recovery time (time given to the muscle to recover from any pain) (3). This means that during repetitive tasks, the musculoskeletal system begins to fatigue and would not tolerate much stress leading to MSDs (41). This form of cumulative load is the product of each load and the loading cycle, and can occur in different combinations (4,41).

The wards at KIH are understaffed with nurses. These working situations may cause repetition of manual tasks, too much load bearing on the tissue, and less recovery time, because nurses are sometimes few to replace others on duty (19). Hence the risk of repetitive manual tasks as a risk factor to develop MSDs among nurses, support the assumption that MSDs is caused by both the repetition of work tasks, too much load bearing on the tissue and less recovery time (4,41).

2.2.3 Multivariate interaction theory

The multivariate interaction theory is based on the assumption that MSDs are caused by multiple factors. This means that MSDs might occur as a result of interactive processes of individual genetic endowment, morphological characteristics, psychosocial makeup, and biomechanical factors (4). Within each of these categories (individual genetic endowment, morphological characteristics, psychosocial makeup, and biomechanical factors) there are many variables which potentiate and effect precipitation of MSDs (41). The MSDs can occur in many ways, and it is theoretically proven that an interaction between the relative weightings of the variables and the extent to which they have been stressed in any given individual determines the final outcomes of MSDs of each individual (4,41). This theory on the development of MSDs is demonstrated in figure 1 below.

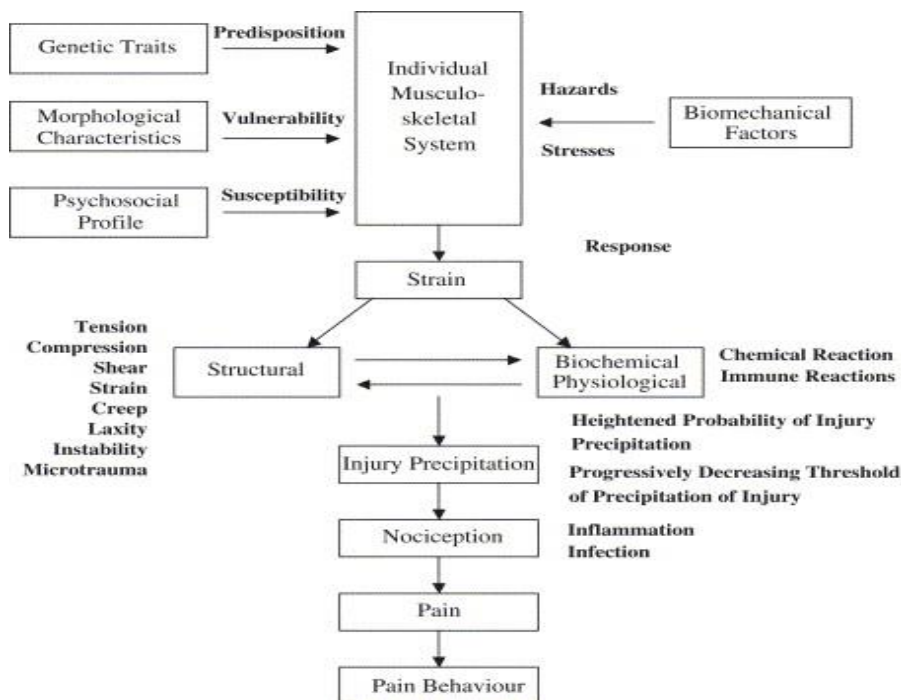


Figure 1: Multivariate interaction theory of the development of MSDs (37).

Nursing is a very demanding job, which involves nurses working while extensively sitting and standing (3). The improper layout of work areas and various job tasks, can make nurses use unnatural standing and sitting positions, thereby exposing nurses to the chance of developing MSDs (41). This supports the assumption that musculoskeletal disorders can be caused by extensive standing and sitting (4,41).

2.2.4 Differential fatigue theory

The differential fatigue theory has indicated that different tasks require different levels of force and efforts to be completed (41). The differential fatigue theory claims that the development of MSDs is muscle specific. This means that different muscle can develop MSDs at different rate and the magnitudes of MSDs' effects to each muscle totally differ. This is based on force required for each task to be completed by each muscle group. The tasks that require higher relative levels of activation in some muscles groups and their connective tissues may cause/put muscles at higher risks of the development of MSDs. This is because such muscles may become fatigued at a faster rate and to the greater level and/ or degree than other muscles and their associated structures (4). The differential fatigue theory assumes that MSDs is likely to occur in the overloaded tissues (4,41).

The study aims at looking into prevalence dues to higher job demand, work overload and understaffing among nurses, and risk factors leading to the development of MSDs among nurses at KIH. The theory claims that different task requires different level of force and efforts to be completed, thereby if physical requirements of the job is greater than the physical capabilities of the worker, then MSDs may develop (41).

Nursing is a very demanding job, which involves work overload, and overworking job tasks, and these various job specific tasks require different certain amount of forces to be completed. Hence different tasks in nursing profession requires different level of force and efforts to be completed by different types of muscles, thereby MSDs is proven to be muscle specific (4,41).

2.3 PREVALENCE OF MUSCULOSKELETAL DISORDERS AMONG NURSES

The recognition of MSDs and its effects on employees are not new, because it was identified among medical practitioners many years ago (21). In the eighteenth century, the Italian physician Bernardino Ramazzinni, was the first to recognise the link between certain job tasks and certain disorders of the musculoskeletal system (21). Since 1960, the International Labour Organisation (ILO) has listed work-related musculoskeletal disorders (WMSDs) as occupational disorders (42). WMSDs are therefore disorders that might occur when nurses happen to be exposed to risk factors that are linked and or related to work and its environment. MSDs can also happen when nurses are exposed to individual risk factors that are not linked and/ related to their professional work (14,27,28,43).

Musculoskeletal disorders are known to be the most common occupational disease and injuries in countries worldwide in their hospital settings, regardless of their degree of industrialization (31). A study conducted in 2011 by Bihari and Kesavachandran has revealed that work-related musculoskeletal disorder affected more than 1.7 billion people worldwide and have the greatest impact on the overall health of the world

population, causing both deaths and disabilities (34). MSDs represent one of the leading causes of occupational disease, injury and disability in the developed and industrially developing countries, with estimates of prevalence ranging from 11-60% (26).

Globally, it was noted that the prevalence of MSDs among nurses working at intermediate hospitals is generally high at 91.9% in rural Japan, 84% in Sweden, 72.5% in the United States and 70% in China (40) respectively. Nursing is ranked the top occupation among all the professions that have the potential to develop MSDs, with the highest prevalence rate of MSDs in the world (30). This is because this occupation has the most physically demanding jobs which involve excessive manual handling of patients and sometime awkward posture during operation (40). In 1994, the nursing profession was ranked first nationally in Uganda in terms of the occurrences of MSDs among nurses compared to other professions in private industries (40). There are burdens of diseases in Africa, yet Africa has few qualified nurses to work in health institution to solve issues of diseases burden; with much effort among nurses to meet and/accomplish job demand, have thus raised the prevalence of MSDs among nurses in Africa (23).

With above, MSDs problems are common and most prevalent in nursing (13). The prevalence of MSDs has varied according to studies but has been generally high in most of the previous studies encountered (26).

With prevalence, in a study on MSDs among nurses from eThekweni District Hospital, have reported the 12 month period prevalence of 77% (44). A similar study conducted on MSDs among nurses working in a higher acuity area in a tertiary hospital in South

Africa, have shown the prevalence of 84% among the study respondents in over a period of 12 months (45). Another similar study conducted in Malaysia on MSDs among female nursing personnel, has shown the prevalence of 88.6% (6).

The prevalence of MSDs has been noted to vary across occupational groups as well as over national boundaries (29). The prevalence of MSDs on body parts and/ or regions differs among nurses. The variation in organisational differences in various hospitals settings, various instrumentation, cultural differences in the perception and reporting of pain and disorders are adduced for the variation in rate of MSDs in the different hospitals of similar studies (9,25,46).

Low back pain is the most known, common, and identified most prevalent body part mostly affected by MSDs (9) . Studies have shown that low back pain was the most prevalent (30-78%) MSDs, followed by the neck, and shoulder pain (17,18,23). Studies conducted in Asia, North America, South America, Antarctica, and Australia, have shown that MSDs among nurses over a 12 month period were most prevalent in lower back pain ranging between 30%-62%, followed by neck pain 36%-54%, and shoulder pain 36%-53% respectively (16,42). Other studies have documented higher annual prevalence of musculoskeletal disorders (work-related) in at least one human body part and/ or region that varied between 40% to 95% in Asian nurses population, and western populations with low back, neck and shoulder pain as the most significant affected body part with prevalence of 29%-64%, 34%-63% and 17%-75% respectively (10). In contrary, the study conducted on MSDs among female nurses personnel at Malaysia have shown that the prevalence of MSDs in different nurses body parts were most

prevalent at neck (48.9%), feet (47.2%), upper back (40.7%), and shoulders, while low back pain was not significantly affected (36.9%).

The study conducted on MSDs among nurses at tertiary care hospitals in India have shown that the prevalence of MSDs in over a 12 month period was most prevalent in low back region (69.6%), neck (34.5%), upper back (29.1%), ankle/feet (27.0%), and knees (26.4%). Another similar study conducted on MSDs among nurses at Ibadan have shown similar results of MSDs most prevalent at low back (44.1%), neck (28.0), and knees (22.4%) (47). Even though many studies have shown variations on MSDs' development in any body parts, the literature have proven that MSDs is most prevalent in low back pain (17,18,23).

Low back pain, neck pain and shoulder pain are the most important work-related MSDs among nursing professionals (16). This body parts-specific prevalence rate are common in nurses, because of risk factors they are exposed to and, due to nurses various working environment, and job demand (psychosocial risk factors) such as stress (15,17,18,43).

2.4 RISK FACTORS THAT CAUSES MUSCULOSKELETAL DISORDERS AMONG NURSES

Musculoskeletal disorders (MSDs) are globally known to be caused by many risk factors (16,24,34,42,48). The risk factors contributing to the development of MSDs can fall into two main categories: Work-related and non-work related (individual-related) risk factors (16,24,34,42,48).

Various studies on the development of MSDs, have shown that when workers are exposed to risk factors their body begin to develop MSDs (7,9,11,47). Studies have shown that MSDs occur when the applied load on the body exceeds the failure tolerance or strength of the supporting tissues (3–5). The human body tissue is defined as the aggregation of morphologically similar cells and associated intercellular maters acting together in order to perform specific functions in the body (49). The tissues referred to are nervous, connective, epithelial and muscles (49).

It is very important to differentiate if MSDs are work-related or individual-related, since both categories have the potential of contribute to the development of MSDs among nurses (21). The risk factors are thus discussed below.

2.4.1 Work-related risk factors

Work-related risk factors entail two main groups of risk factors, namely physical (ergonomic) and psychosocial risk factors. The psychosocial risk factors are further divided into two groups, namely job content and organisational characteristics risk factors (22).

2.4.1.1 Physical risk factors

Physical risk factors are the aspects of the job or tasks that contribute to the development of MSDs when they impose a biomechanical (biological systems) stress on the worker (8). The physical risk factors are work-related risk factors which include repetitive manual tasks, extensive sitting, extensive standing, awkward postures and manual handling including patients handling. Studies have revealed work-related risk factors such as extensive standing, repetitive manual tasks, awkward posture, and manual handling including patient handling being the most common risk factors contributing to the development of MSDs among nurses (16,24,48). A study conducted on MSDs among nurses at national referral hospital, Mulago, Uganda have supported that the development of MSDs among nurses from that hospital was associated mainly with physical risk factors since the p-value was less than 0.05 (40). The followings have detailed out how each categories of physical risk factor contribute to the development of MSDs.

Repetitive manual tasks

Repetitive task means doing a certain activity on a certain pace of rotation. Repetitive manual tasks involve the use of the same group of muscles/joints for the same continuous motion to complete one cycle of a given task. The time it takes to complete the task is less than a few minutes, but the cycle continues for up to two hours (23,24,42,50). The result is that the body muscles biological system does not have enough time to recover from such stress (23,24,42,50). In a study done in Malaysia on risk factors related to lower back disorders at workplace, indicated that repetitive manual

tasks were among the top risk factors identified to cause MSDs of low back pain among nurses (46). Similar study conducted on risk factors that might contribute to the development of MSDs among nurses in tertiary hospital India has indicated that performing the same task over and over (29%) was among the top most risk factors contributing to the development of MSDs among all study participants (10). This finding is supported by cumulative load theory which has indicated that MSDs is caused by repetition of work tasks and this contributes to the development of MSDs (4,41).

Extensive sitting or extensive standing

Extensive sitting means sitting for any extended period of time, and extensive standing means standing for longer period of time. Extensive sitting or extensive standing is an abnormal condition that can contribute to the development of MSDs among nurses (22). Any human body position can cause discomfort and fatigue if it is maintained for long period of time. Improper layout of work areas, and various job tasks can make workers use unnatural standing positions, thereby leading to the development of MSDs (23,24,26). A study conducted in Tunisia on the prevalence and risk factors of MSDs among hospital staff, found that most nurses have suffered from MSDs due to prolonged standing or sitting, with a probability value of 0.016 and 0.023 respectively (51). This finding is supported by the multivariate interaction theory that MSDs are caused by multiple factors (41). Similar study conducted on MSDs' risk factors among nurses in tertiary hospital India has indicated that working in the same position for long period (37.10%), was among the most risk factors contributing to the development of MSDs among all study participants (10).

Awkward postures

Awkward postures means that the body's natural alignment is out of its original position while working for extended periods of time, which put stress on the body, thus increasing the risk for the development of MSDs (16). Awkward postures involve twisting, bending, and extended reach (16). Static postures are postures that are maintained for an extended period of time to perform a particular job task thereby causing certain body muscles to become fatigued as a result of constantly contracting to hold the position (27). This increases the chance for the body to develop MSDs. A study conducted in India on the assessment of risk factors of work-related musculoskeletal disorders among health care professionals in a tertiary hospital, have indicated that working in awkward positions was the main job risk factor that contributed to WMSDs among nurses (10).

Manual handling

Manual handling means task are done with hands or related to use of hands. Manual handling of tasks including patient handling involves tasks such as carrying, lifting, pulling and pushing, and this job tasks require certain amount of body efforts to complete tasks (6,7,29,41). Some work requires higher force loads on the human body, but if the amount of force exceeds the worker's bodily capabilities, this increase the risk of developing MSDs (10,22,27). A study conducted among nurses in Kenyatta National Hospital, have shown that 34% of the nurses reported neck and shoulder pain as a results of patient handling tasks that involved pulling, pushing and reaching (26). These scientific explanations are supported by the overexertion theory, and differential fatigue

theory. Overexertion theory suggests that MSDs are caused by the amount of force exerted by the muscle in order to complete a task (41). The greater the force that is put on task the greater the level of stress that is put on the musculoskeletal system (27). The differential fatigue theory indicates that different tasks requires different levels of force and efforts to be completed (4).

2.4.1.2 Psychosocial risk factors

Psychosocial risk factors are things that affect employees' psychological response to their work and workplace condition, and/ or referred to individual subjective perceptions of the organisation of work (7,22,24). The Psychosocial risk factors involve the two main categories of factors, namely job content and organisational characteristics risk factors. The two categories of risk factors are differentiated below.

The job content risk factors: The job content risk factors involves high workloads, tight deadlines, and lack of control of the work and working methods (7,22,24,31,52,53).

The organisational characteristics risk factors: The organisational characteristics risk factors deals with risk factors such as poor working relationship with supervisors and colleagues, financially demoralized, poor work/rest cycle, and poor community support (23,24).

Psychosocial risk factors and development of MSDs

Both work organizational risk factors related to job content and organisational characteristics risk factors are all psychosocial risk factors. There is no significant different between the two categories of this risk factors because they all influence and/

or contribute to the development of MSDs in the psychosocial manner. Thus the followings discuss in detail the psychosocial risk factors as a contributor to the development of MSDs.

The psychosocial risk factors work hand in hand with physical risk factors, since psychosocial risk factors cannot be seen as risk factors that by themselves lead to the development of MSDs (21). The combination of psychological and physical risk factors can increase the risk of injuries/conditions of MSDs. Thus, if the physiological perceptions of the work are negative, negative reactions of physiological and psychological stress may occur, and such reactions could lead to physical problems, such as muscle tension (7). On the other hand, some employees might adopt incorrect working methods, the omission of breaks, use of excessive force, inappropriate object handling methods that might lead to work-related MSDs (21).

A comparative study conducted in Uganda in five different hospitals, found that 3.4% of the total nursing population in the five different hospitals have developed MSDs as a result of stress at work (28). A study conducted in Malaysia on the work-related risk factors contributing to the development of MSDs among hospital nurses revealed that occupational stress is common in nurses and it contributes to a decrease in efficiency among nurses due to health problems (54).

2.4.2 Non-work-related risk factors

Non-work-related risk factors are individual risk factors that can increase the likelihood for the occurrence of MSDs among nurses (22,24–26) . Non-work-related risk factors are divided into two main categories, namely demographic risk factor, and lifestyle,

social context and the external work environment risk factors (22,24–26). The demographic and lifestyle risk factors are detailed below.

Demographic risk factors

The demographic risk factors refer to gender, age and body mass index (7,27). In terms of gender, women are three times more likely than men to develop MSDs (55,56). This is because women have less muscular strength than men (55,56). Studies found a higher prevalence of MSDs among women than men (55,56). The fact that more women are hired in Africa may account for the greater number of reported non-work related MSDs among female nurses (21). Studies have revealed that individual-related risk factors are most common, especially in female nurses because they are likely to do after work responsibilities including parenting, undertaking domestic loads, insufficient rest time and lack of exercises (57).

In terms of age, young nurses are at a lower risk of developing MSDs, because the functional capacity of soft tissues, muscles strength, and resistances to stress is good (58). The risk of development of MSDs for both men and women increases with age (21). This is supported by a study conducted in North Carolina, about age-related changes in the musculoskeletal system and the development of osteoarthritis. It indicated that osteoarthritis increases with age, since 30%-50% of adults over the age of 65 years suffer from this condition (58). Therefore age is the concerned risk factor. In addition, a comparative study conducted in Uganda in five different hospitals, indicated that age, stress and self-reported poor general health status, were important factors in the development of MSDs among nurses (28).

The anthropometry is the study measurement and proportions of human body. It measures the height, weight and body mass index of human body. This anthropometry measurable items are another non-work related risk factor contributing to the development of MSDs (21). MSDs are reported to be more among obese nurses than slender nurses (21). A study conducted in Uganda on the occupational related MSDs among nurses at the Mulago National referral Hospital, determined that obesity was common among nurses who reported to suffer from MSDs of back pain (40). This is likely to happen because obesity is the individual risk factor that put the body at risk of developing MSDs such as low back pain.

Lifestyle, social context and the external work environment risk factors

Risk factors associated with lifestyle, social context and the external work environment entail alcohol, smoking, exercise, sport, leisure activities, housekeeping work and other roles of the individual outside work places that might contribute to the development of musculoskeletal disorders (7,27). Poor health habits refer to excessive drinking, being obese, smoking and lack of exercises (10). Nurses with poor health habits have a higher risk of developing MSDs, because their bodies are weak, stressed and may not able to handle work easier as for the healthier bodies (23,24,42). Muscle fatigues (the decline in ability of a muscle to generate force) are common in unhealthier bodies. Poor fitness can also put the body at a higher risk to develop MSDs (10). However, studies of physical fitness due to exercises have produced mixed results (59). Exercises or sport can cause injuries of MSDs (59). The lack of physical activities can also increase susceptibility to MSDs (21).

Nurses who were frequently involved in leisure time activities, were less likely to suffer from low back pain, unlike nurses who have less leisure time activities (21). This means that leisure time activities are beneficial to the body that it make it fit so that its' tissues will be less likely to develop MSDs. Musculoskeletal symptoms are often relieved by physical activities (59). Smoking is associated with low-back pain, intervertebral herniated or sciatica (21).

2.4.3 Human body parts and their specific causal risk factors to develop MSDs

The various risk factors have different magnitude, influences and impact on each human body part and/ or region. Lifting patient(s) in bed, transferring patients out of bed, and lifting from the floor were the job activities most commonly reported as a main sources of back pain among nurses (3,19). A study conducted on MSDs' risk factors among nurses at Southampton in United Kingdom have indicated that neck and shoulder pain was associated with physical exposure including patient handling at work(52). The same study has indicated that psychosocial factors where not with any incident of back, neck or shoulder pain (52).

A study conducted to assess the causes of low back, neck and shoulder pain, aches and discomfort, have indicated that back pain occurred after prolonged standing, neck pain occurred after prolonged sitting, and shoulder pain occurred after being exposed to work that required lifting heavy load overhead, repetition of certain movement, and working at awkward posture(52).

2.5 IMPACT OF MUSCULOSKELETAL DISORDERS AMONG NURSES

MSDs have increased worldwide, causing work-related disabilities among workers from various professions (10). MSDs in the workplace have a huge impact, emerging as a growing problem in our modern societies and they represent the second largest cause of short-term or temporary work disabilities (10). MSDs are responsible for morbidity in many working populations and are known as an important occupational problem with increasing compensation (45). Global statistics indicate that two million people die annually due to work-related MSDs. It is reported that 160 million new cases of work-related MSDs are reported globally each year (16). Globally, MSDs have a higher impact on health care workers with the nursing population that constitute about 33% (20). The nature of nurses' work has made them more prone to the development of MSDs (20).

Studies have shown that MSDs is the most expensive form of work disability. Globally, the total cost associated with MSDs' various costs and spending has increased in the United States from \$81 billion in 1986 to \$215 billion in 2005 (51). It was estimated that the cost of MSDs was approximately 215 billion dollars in 1995 in the United States; 26 billion Canadian dollars in 1998 in Canada, and 38 billion Euros in 2002 in Germany (10,60). MSDs are one of the major occupational health problems in India contributing about 40% of all costs toward the treatment of work-related injuries (10). Studies conducted in Australia and Canada revealed that MSDs have a serious social and economic impact to such an extent that prevention strategies need to be designed (6).

Nurses developing acute and cumulative MSDs is one of the impacts of MSDs among nurses that need to be treated and prevented from future occurrence because it is life threatening and is unhealthy to experience and/ or suffer from such disorders (61). All over the world, including Africa where Namibia is situated, the most common impacts of MSDs among nurses are taking leave due to work overload, nurses quitting their profession, lost working time, medical bills, wages paid during absence, workers' insurance funds and loss of nurses quality of life, possible low productivity as few patient will be attended to since nurses have to seek for medical attention instead (6,10,16,20,27,62).

Studies conducted in Egypt, Malaysia and Nigeria indicated that MSDs lower the quality of workers' life and reduce their productivity (10,27). The study conducted on the impacts of MSDs among Netherlands nurses have shown that MSDs can affect the working attendance of nurses, ranging from five up to 30 days of work (63). Nurses are likely to go on irregular unplanned leave, because of pain due to MSDs (6,42,61). Pain due to MSDs (on different body part) impact's on nurses' performance, because pain make work or functional tasks difficult (3).

Another study conducted on work-related MSDs among nurses indicated that nurses are likely to be prevented from doing their normal duty, and are sometime absent from work due to the MSDs (19).

MSDs negatively impact on nurses' health leading to incapacitation, poor performance and productivity at work (40,45,61). Incapacitation leads to work absenteeism and workload constraints which ultimately affect the quality of patient care (40). Another

impacts of MSDs are poor patient outcomes, work demoralisation , early retirement of nurses (40). MSDs further impacts on nurses' quality of life, cause lost working time, cause absenteeism, nurses transfer to another job, cause disability among nurses and, cause huge economic toll on the individuals (6,42,61).

Another impact of MSDs among nurses is stress development that occur as a result of nurses exposed to psychosocial risk factor at work place (7). Stress development can result in mental strain which lead to increased existing physical strain and muscular tension (50). Stress is a dangerous condition, since the body may experience stress-related changes which increases muscle tension. This makes nurses more vulnerable to the development of musculoskeletal disorders (22,24).

In conclusion, though many studies have revealed similar impacts, it differs from health institution to health institution in developed, less developed, and developing countries. A study on MSDs among nurses in Ibadan, South-west Nigeria, has found that the most impacts of MSDs among nurses were reduced quality of life, increased absenteeism, nurses resigning to other profession, disability, and economic toll due to individual and social issues (29). In India, however, the most impacts of MSDs were reduced productivity, lowering of the quality of workers' life, and high costs linked to work disability (62).

2.6 SUMMARY

The prevalence rate of MSDs in nurses is seem to be commonly high within the prevalence range between 60-95% (14–18). Low back pain is most prevalent body part affected by MSDs (9) . The risk factors associated with MSDs are classified as work-related and individual-related risk factors (22,24–26). Work-related risk factors entail two main categories of risk factors, namely physical and psychosocial risk factors. The psychosocial risk factors entails two main groups of risk factors, namely job content and organisational characteristics risk factors (22). Individual-related risk factors is divided into two main categories, namely demography risk factors, and lifestyle risk factors including social context and factors related to external work environment (22,24–26). The impact of MSDs involve nurses taking much leaves, quitting the profession, lost working time, and lost quality of life (5). This means that MSDs result in human and economic loss to health care institutions.

The next chapter will cover the research methodology.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter covers information on the research design, population, sampling and sample, research instrument, validity and reliability, procedures, data analysis used in this study. The chapter also entails information on research ethics that were considered for this study.

3.2 RESEARCH DESIGN

This was a cross-sectional, descriptive-analytic quantitative research. A cross-sectional study was used as it is useful in collecting data on a specific topic, at a specific time in a specific population (64,65). It was therefore an appropriate design to determine prevalence, risk factors and impact of musculoskeletal disorders (MSDs) among nurses at various clinical departments at Katutura Intermediate Hospital (KIH).

Descriptive studies result in rich data that is collected in large amount (66). This approach was useful to determine and describe the prevalence, risk factors and impact of musculoskeletal disorders among nurses. The analytic approach to identify variables that could be tested for association between exposure outcomes (66), was useful to describe association between risk factors and the development of MSDs. The quantitative method seeks to obtain an accurate and reliable measurement that allows statistical analysis (64,65). It was therefore the appropriate approach to describe the results of the study.

3.3 POPULATION

The study population was all 404 nurses who are working at Katutura Intermediate Hospital for a one year period and more.

3.4 SAMPLING AND SAMPLE

Epi Info™ version 7 databases and statistics program was used to calculate the representative sample of the study respondents. A 95% confidence level was used to calculate the sample of 197 nurses from the total nursing population of 404.

The following formula was used to calculate the sample size:
$$n = \frac{\left(\frac{z^2 \times p(1-p)}{e^2} \right)}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N} \right)}$$

n is the sample size, z is the z-score of 1.96 at the standard confidence level of 95%, N is the population size, e is the margin of error, and p is the sample proportion of 0.5 that was gained using a conservation formula based on $p = 0.5$.

Given; $Z=1.96$, $e=0.05$, $p=0.5$, and $N=404$

$$n = ((1.96^2 \times 0.5(1 - 0.5) \div 0.05^2)) / ((1 + ((1.96^2 \times 0.5 (1-0.5) \div 0.05^2 \times 404)))$$

$$n = 196.92$$

$$n = 197$$

Simple random sampling was used to collect the representative sample of 197 from the total population of 404 nurses. The Random Allocation Software (RAS) was used to filter and randomly select the sample, using the nurses' registration numbers and years of employment. The bootstrapping is the resampling test that was used when certain

study participants who were randomly selected in the first place were out of work with mission and/ or they were on leave that they could not be found during the time of data correction. The bootstrapping resampling test relies on the random sampling with replacement, which mean the member who was randomly selected first will be automatically omitted in the second round of random sampling of study participants (67).

Inclusion and exclusion criteria

The inclusion criterion to select the sample was all categories of nurses who were employed for one year and more. All nurses who were employed for less than one year were excluded from the study.

3.5 DATA COLLECTION

The data collection includes the research instrument, pilot study, and procedure.

3.5.1 Research instrument

The Standardized Nordic Musculoskeletal Questionnaire (M-SNMQ) was used to estimate the prevalence, risk factors and impact of MSDs. The questionnaire was a self-administered questionnaire. The questionnaire contained section A for demographic information, section B for information about prevalence of musculoskeletal disorders among nurses, section C for information about risk factors that causes musculoskeletal disorders, as well as section D containing information about impact of musculoskeletal disorders among nurses. The Epi Info™ version 7 databases and statistics program was used to determine if there was association between risk factors and the development of MSDs among nurses.

3.5.2 Pilot study

A pilot study is a small-scale preliminary study conducted before the main research to check for feasibility and improve on the research tools (71). A pilot study was conducted among 20 randomly selected nurses working in another hospital in Windhoek. There was no adjustment needed.

3.5.3 Procedure

Study participants were given the questionnaires to complete in their own time after which the completed questionnaires were collected by the researcher.

3.6 VALIDITY AND RELIABILITY

Validity and reliability is used to measure and ensure that the questionnaire used in data collection as an instrument have measured what it is meant to measure (68–70). Validity was ensured through the literature review, the use of an existing instrument, as well as expert reviews. Reliability measures the stability, consistency and repeatability of results in this descriptive quantitative research (70). In this study, reliability was ascertained through a pilot study.

3.7 DATA ANALYSIS

The data was analysed using Epi Info™ software version 7, IBM SPSS Statistics 25, as well as Microsoft Excel 2010. The data were cleaned and coded before statistical analysis. Frequencies and percentages related to prevalence, risk factors and impacts of MSDs among nurses were calculated before statistical comparison were made through

multiple logistic regression, based on the significance level of 5% and this reflected a p-value region of less than $\alpha = 0.05$. Data was then displayed in graphs, figures and tables.

3.8 RESEARCH ETHICS

Permission to conduct the study and ethical clearance were obtained from the postgraduate studies committees of the University of Namibia, the research unit of the Ministry of Health and Social Services, as well as the management/superintendent of Katutura Intermediate Hospital.

The following ethical considerations were also observed:

Principle of justice: participants were randomly selected to give each individual a fair chance to be selected.

Anonymity and respect for the participant: questionnaires were completed anonymously with an individual code number. There was no reference to personal information traceable to the respondent, since data was aggregated. Participants were informed that participation is voluntary and that they could withdraw from the study at any time.

Principle of beneficence: there was no foreseeable harm to the participants.

Informed consent: participants were informed about the aim of the study prior their enrolment to participate. Participants were informed that to participate in the study is voluntary and they may withdraw from the study at any time, should they prefer to do so.

Confidentiality: the confidential information and subjects identified/seen during the study were kept confidential and not disclosed to anyone outside the project.

3.9 SUMMARY

The cross-sectional, descriptive-analytic quantitative research was conducted. Considering 95% confidence level and using RAS computer software, the total of 197 nurses were randomly selected from the total of 404 nurses who have served for 1 year period or more in nursing. A self-administered questionnaire was used to collect the information. Validity and reliability was ensured. The statistical tools Epi Info™ software, IBM SPSS Statistics, and Microsoft Excel were used for descriptive statistical analysis, with results presented in graphs and tables. Research ethics were adhered to.

The next chapter contains information about the study results findings and detailed discussions.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

In this chapter, the researcher presents and discusses the results of the data collected through the self-administered questionnaire from a sample of nurses at Katutura Intermediate Hospital (KIH). The results of this study are illustrated using tables and graphs.

4.2 PRESENTATION OF RESULTS AND DISCUSSIONS

The results and discussions are presented under the following sub-topics: Socio-demographic information and occupational profile, prevalence of MSDs among nurses, risk factors contributing to the development of MSDs among nurses, as well as the impact of MSDs among nurses.

4.2.1 SOCIO-DEMOGRAPHIC INFORMATION AND OCCUPATIONAL PROFILE

Socio-demographic information included gender, age and Body-Mass Index (BMI). Occupational profile dealt with numbers of years working in the profession, age of respondents when MSDs developed, the time respondents have been working in nursing profession versus MSDs development, current working department and time of job rotation from one department to the another, average hours of overtime per week worked and average days off duty per week.

4.2.1.1 Gender

The gender of the study respondents is shown in figure 2 below.

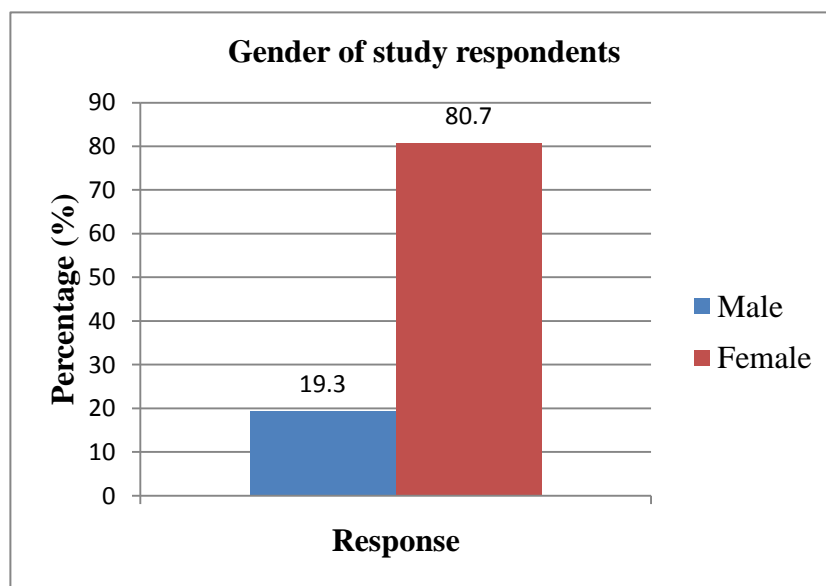


Figure 2: Gender of study respondents (n=197)

In terms of respondents' gender, the results showed that more females (80.7%) than males (19.3%) participated in the study. In the Namibian population, women are more than men (73) thereby it is normal and/ or possible for more women to be in the nursing profession than men at Katutura Intermediate Hospital (KIH).

In a similar study done on MSDs among nurses, reported almost similar results in that the majority of respondents were female with 76.9%, while male respondents were fewer with 23.1% (7). Since nursing is a female dominated profession (74), it is therefore clear that the nursing profession attract more women than men (7).

4.2.1.2 Age of study respondents

The age of study respondents is shown in figure 3 below.

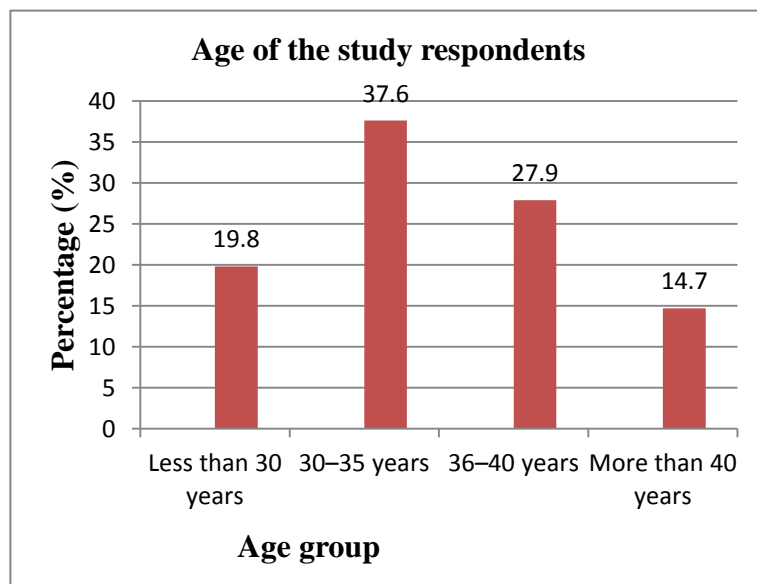


Figure 3: Age of study respondents (n=197)

The majority of the respondents (n=197), were between the ages of 30 and 35 years (37.6%). The age of respondents between 36 and 40 years was 27.9%, while those less than 30 years were 19.8%. A smaller percentage of 14.7% were older than 40 years.

The majority of study respondents are aged between 30 and 35 years. The Namibia Demographic Survey of 2016 indicates that the Namibian population comprise of many young adults (75). Young nurses are readily employed after graduation, yet some young nurses are willing and/ or leaving nursing profession and re-educate themselves for a new career (75). That could be why study respondents that are less than thirty years were

few. Nurses older than 40 years are likely to change their work dramatically, including opting for retirement or leaving the nursing field for other types of work (75).

4.2.1.3 Age of respondents' versus MSD development

The age of the study respondents versus the development of MSDs is shown in figure 4 below.

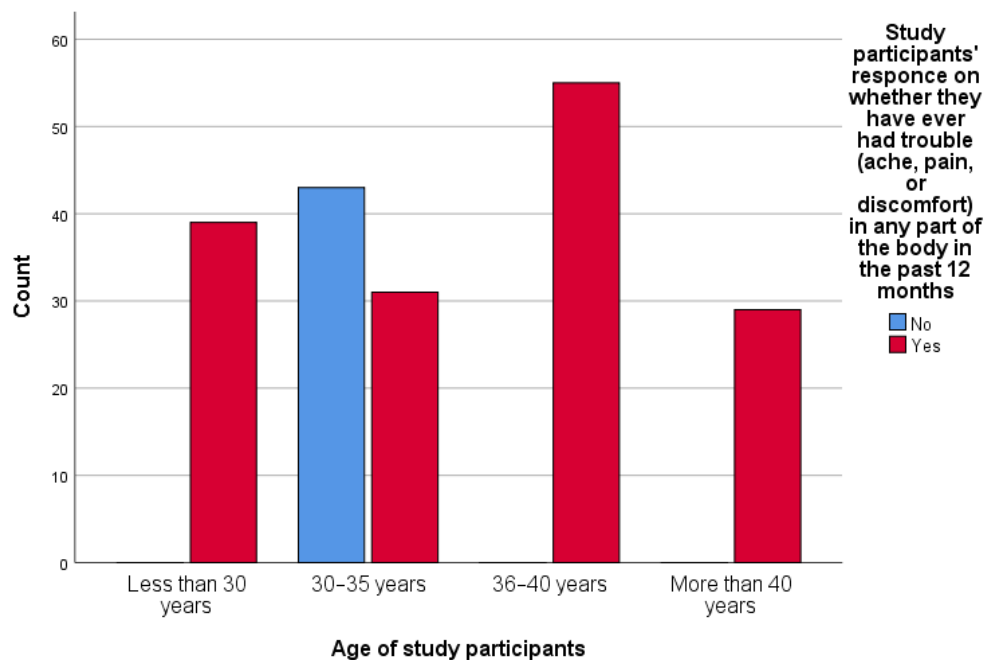


Figure 4: Age of respondents versus MSDs' development (n=197)

The results indicated that most respondents who experienced MSDs were in the age range of 36 to 40 years old (55%). The respondents who fell in the age group of less than 30 years (39%) are the second leading group experiencing MSDs. The age group who experienced the least MSDs were those over the age of 40 years (29%). However 43% of respondents under the age group of 30-35 years have indicated that they never

experience any pain or discomfort in the past 12 months, and 21% of the same age group have confirmed to have pain or discomfort in the past 12 months.

A study conducted regarding WMSDs among nurses in Ibadan, south west Nigeria, has shown that the prevalence of MSDs increased with an increase in age (29). Similarly, findings in a study on MSDs conducted among nurses working in hospitals of Xinjiang Uygur Autonomous Region, have shown that MSDs increase with the age (42). Thus, the older the workers get, the greater the chance of developing MSDs (10,16, 17, 21, 28, 29, 42, 53).

The findings of this study, however, reflected that there is no association between age and the development of MSDs since the determined p-value is 1.000. The statistical test chi square was determined to get p-value using Epi Info™ version 7 databases and statistics program in order to prove or disapprove if there is association between age and the development of MSDs among nurses at KIH. Supportively, a study conducted on MSDs among nurses working at eThekweni district hospital have shown that there was no significant relationship between age and the development of MSDs (44).

Thus, the results showed that age is not linked to the development of MSDs among nurses at KIH.

4.2.1.4 Body-Mass Index of study respondents

The Body-Mass Index of study respondents is shown in figure 5 below.

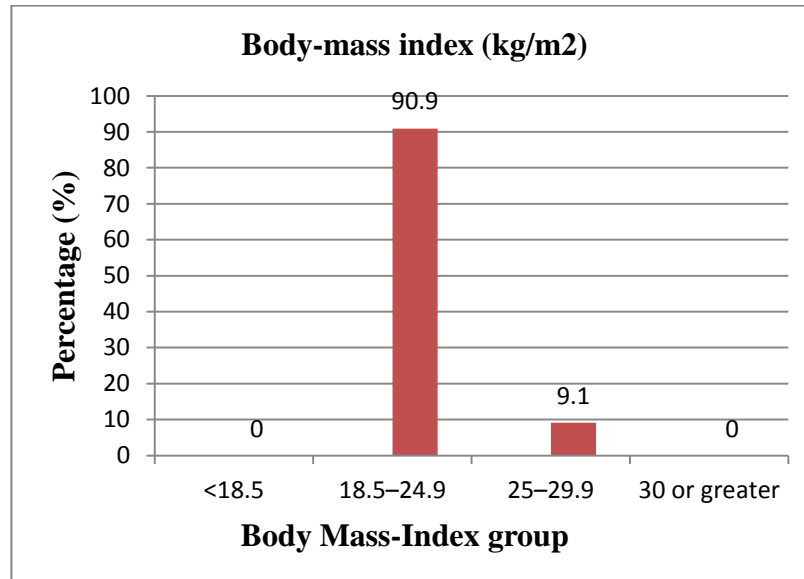


Figure 5: Body-Mass Index of study respondents (n=197)

The respondents' responses on their body mass have shown that majority of them have a Body-Mass Index (kg/m^2) of 18.5–24.9 (90.9%), followed by the least BMI (kg/m^2) of 25–29.9 (9.1%).

A BMI <18.5 is classified as underweight, 18.5-24.9 normal, 25.0-29.9 overweight, and 30 or greater is classified as obese (76). Overweight and obese people are at a higher risk of developing MSDs (77).

Results have shown that neither of the study respondents had BMI (kg/m^2) of <18.5 and/or 30 or greater. Thus, BMI could have no significant and/could not be related to MSDs development in this study, because the BMI (kg/m^2) of 25–29.9 of most of the respondents, is classified as normal BMI (78). However, the statistical test chi square

was used to calculate the p-value (using Epi Info™ version 7 databases and statistics programme), in order to prove or reject association between BMI and the development of MSDs among nurses at KIH.

The p-value = < 0.001, which is less than 0.05 proves a strong association between BMI and the development of MSDs among nurses at KIH.

4.2.1.5 Occupational profile of respondents

The information about the time study respondents have been in employment as a nurse is shown in figure 6.

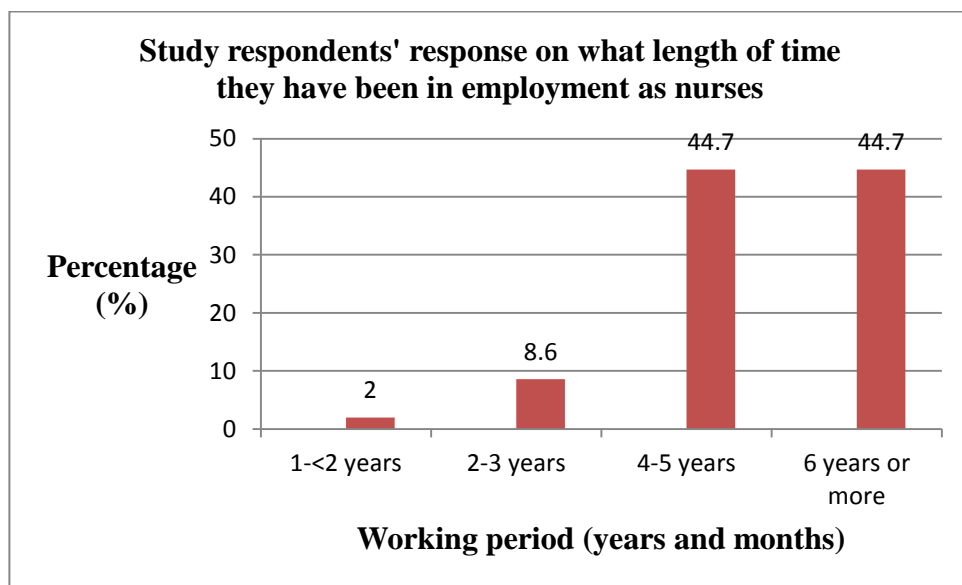


Figure 6: Time worked in nursing profession (n=197)

Based on the study respondents' responses depicted in figure 6, most of the nurses have been working in the nursing profession for four to five years, and for six years and more (44.7%), for both ranges. Only a small number of the respondents (2%) worked for one

year and some months, while 8.6% worked for 2 to 3 years, in nursing profession respectively.

A study conducted on WMSDs among nurses in Ibadan have shown that study respondents have been in nursing profession around 11-20 and over 20 years (61), while respondents in a similar study in Hospitals of Xinjiang Uygur Autonomous Region, have been in the nursing profession for six years and more (42).

The results indicated that most nurses worked in the nursing profession for six years and more in KIH.

4.2.1.6 Time respondents have been working in nursing profession versus MSDs development.

The time respondents were employed in the nursing profession versus MSDs development is depicted in figure 7.

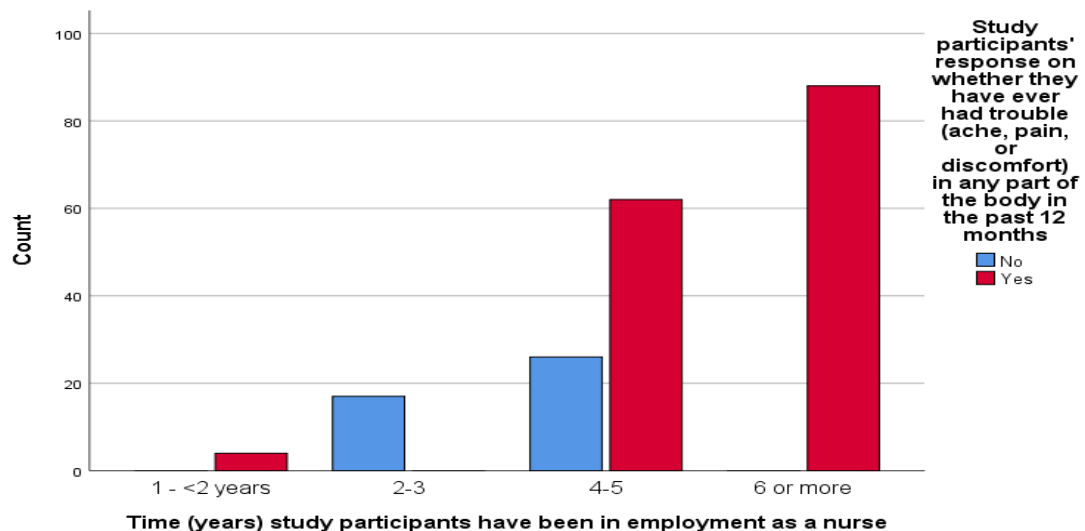


Figure 7: Time respondents have been working in nursing profession versus MSDs development (n=197)

The results showed that nurses who worked in the nursing profession six or more years (88%) have the highest rate of MSDs development, compared to nurses who served for less than 6 years. This finding is also supported by other researchers who indicated that the longer the person has been working in the nursing profession, the more the chance of developing MSDs.

The more time workers are in employment (working industry) the greater the chance of developing MSDs (10,42). The findings in a study conducted on MSDs conducted among nurses working in hospitals of Xinjiang Uygur Autonomous Region, have shown that MSDs increase with the years in services (42). A similar study among nurses in Ibadan, south west Nigeria, has shown that the prevalence of MSDs increased with an increase in age, and years in service (29).

Thus, the results showed that the time period nurses have been working in the nursing profession, could contribute to the development of MSDs among nurses at KIH.

4.2.1.7 Average hours of overtime per week

The average overtime hours that study respondents use to work is shown in figure 8.

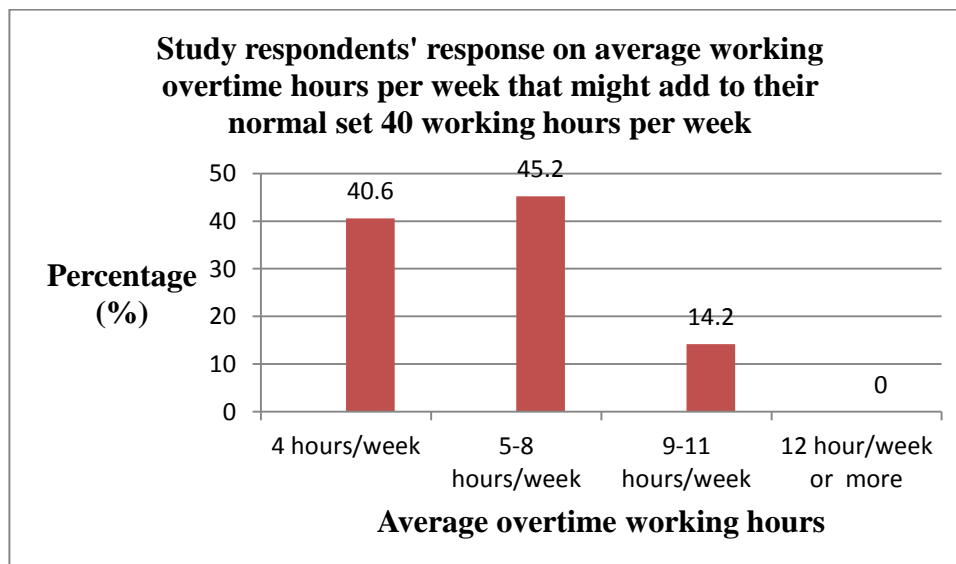


Figure 8: Average hours of overtime per week (n=197)

Most respondents (45.2%) worked five to eight hours of overtime, 40.6% worked four hours of overtime, while and 14.2% worked nine to 11 hours overtime, per week.

Studies on issues contributing to MSDs development, indicated that adverse work schedules such as 13+ hours of work per day and overtime, are significantly related to the development of MSDs (16,48,53). Long working hours per shift, as well as working hours above the standard of 40 working hours per week, result in an increased chance of muscle stress and fatigue, less resting time and less muscles resting recovery time (13,14,43).

Even though working overtime is not a direct standalone prevailing risk factor, working overtime might worsen the situation of nurses to develop MSDs.

4.2.1.8 Average days off duty per week

The information on the most average days per week respondents used to be off duty is shown in figure 9 below.

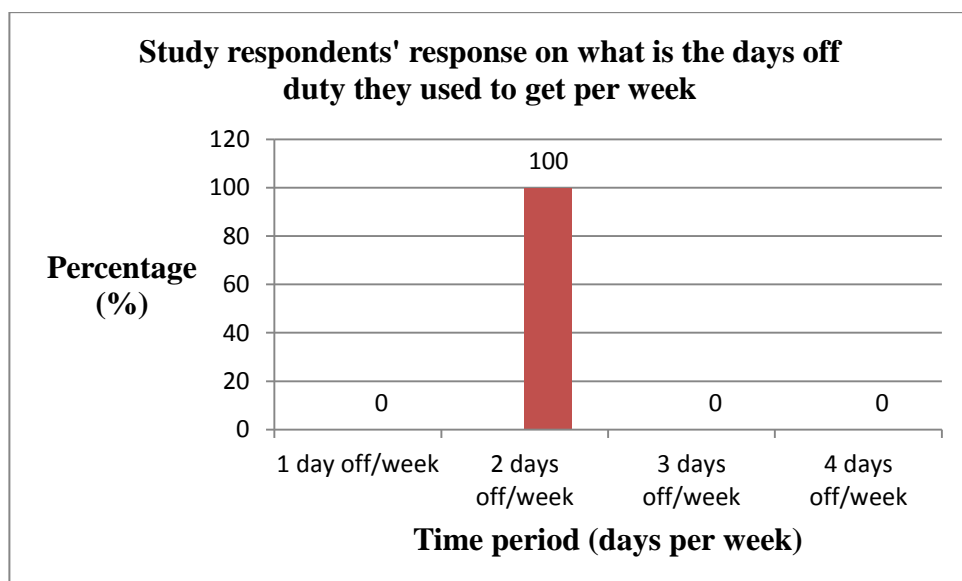


Figure 9: Average days off duty per week (n=197)

All study respondents responded that they got two days off duty per week (100%).

Resting (break) time for at least >10 minutes or spending two days of duty per week was proven to be enough resting time for the body's musculoskeletal system to recover from any pains or situation that might lead to the development of MSDs (43,79). The cumulative load theory has proven that MSDs occurs as a result of the repetitions of work tasks and/ or too much load bearing on the tissue and less recovery time, therefore sufficient recovery time will prevent MSDs from happening (4,41).

The results indicated that respondents have adequate resting time, therefore cannot be linked to the contribution of MSDs development among nurses at KIH.

4.2.2 PREVALENCE OF MSDS AMONG NURSES

Study respondents had to indicate the prevalence of MSDs in any body part during the past 12 months.

4.2.2.1 Prevalence of MSDs in any body part in the last 12 months

The prevalence of MSDs among study respondents, in any body part in the last 12 months is shown in figure 10 below.

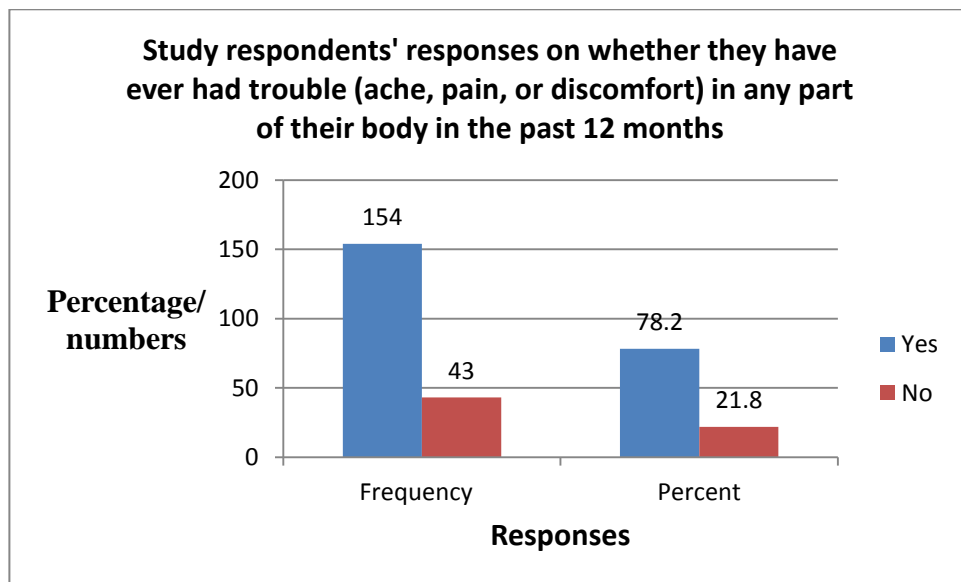


Figure 10: Prevalence of MSDs among respondents at KIH (n=197)

Among the total of 197 study respondents, 78.2% of the respondents reported a 12-month prevalence of MSDs in any part of their bodies. The other respondents, (21.8%) reported no MSDs in any part of their bodies in the last 12 months.

A previous study on MSDs among nurses from eThekweni District Hospital reported a prevalence of 77% in a 12 month period (44). A similar study in a high acuity area in a tertiary hospital in South Africa, found the prevalence of 84% among study respondents

in a 12 month period (45). Another similar study conducted on MSDs among female nursing personnel from Malaysia had shown the prevalence of 88.6% (19).

The prevalence rate of 78.2% of MSDs in nurses in this study, was within the prevalence range 60-95%, also found in other studies (14–18).

4.2.2.2 Prevalence of MSDs in the different body parts

The prevalence of MSDs in the different body parts among study respondents is shown in figure 11 below.

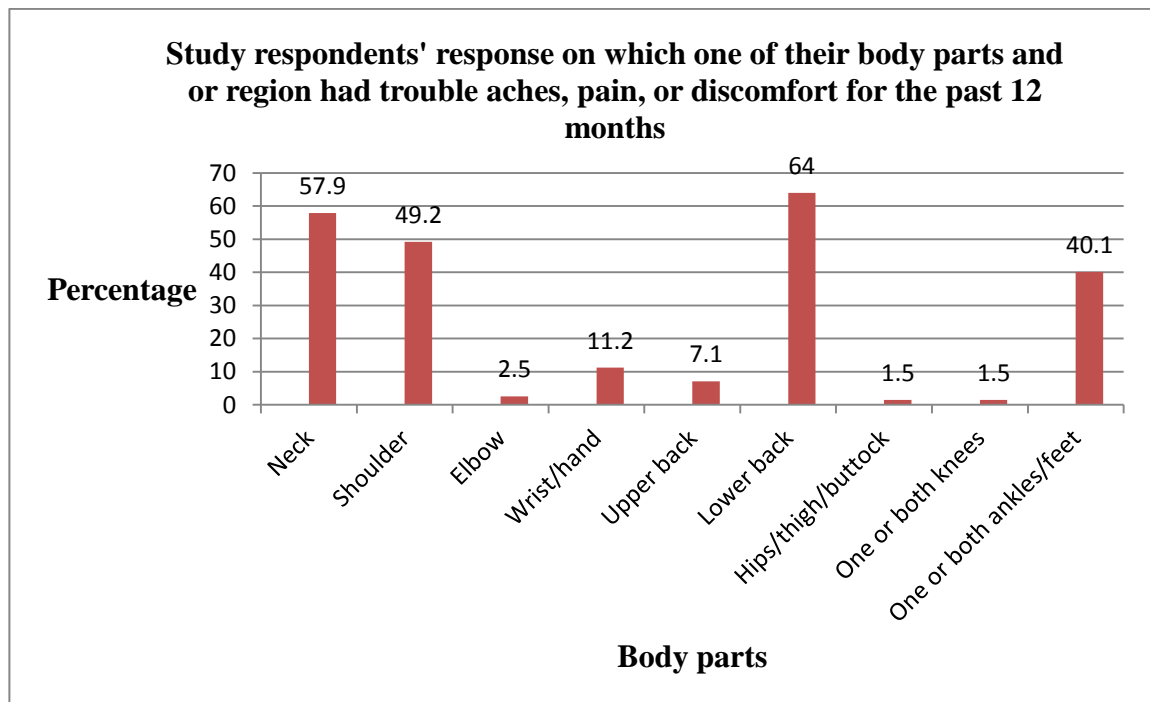


Figure 11: Prevalence of MSDs in the different body regions (n=197)

Figure 11 shows that the prevalence rate of MSDs among nurses, in the past 12-months, was highest in the lower back (64.0%) followed by the neck (57.9%), shoulder (49.2%) and then one or both ankles/feet (40.1%). The prevalence rate of MSDs among nurses

was least in the upper back (7.1%), elbow (2.5%), hip/thigh/buttock (1.5%), and one or both ankles/feet (1.5%).

The 12-month prevalence rate of MSDs among nurses in this study was highest in the lower back, neck and shoulder. Low back pain is the most known, common, and most identified prevalent body part (30-78%) affected by MSDs (9) . Studies have shown that low back pain was the most prevalent MSDs, followed by the neck, and shoulder pain (9, 19, 23).

A study conducted on MSDs among nurses at a tertiary care hospital in India revealed that the prevalence of MSDs in 12 months was most prevalent in low back region (69.6%), neck (34.5%), upper back (29.1%), ankle/feet (27.0%), and knees (26.4%). A similar study conducted on MSDs among nurses at Ibadan, also indicates that MSDs was most prevalent in low back (44.1%), neck (28.0), and knees (22.4%) (47).

However, a study conducted on MSDs among female nurses in Malaysia have shown that the prevalence of MSDs were most prevalent at neck (48.9%), feet (47.2%), upper back (40.7%), and shoulders, while low back pain was not significantly affected (36.9%).

Even if different studies have revealed different results pertaining different body parts affected by MSDs, it is very clear that most studies are supporting that lower back, neck, shoulder are usually higher compared to other body parts. Low back pain, neck pain and shoulder pain are the most important work-related MSDs among nursing professionals (16). This body parts-specific prevalence rate are common in nurses because of risk factors related to the working environment and job demand (18,21,43).

The findings of this study on the higher prevalence of low back, neck and shoulder pains among nurses as common body sites mostly affected by MSDs is consistent with the pattern reported in literature, (2, 12, 16, 20, 25).

4.2.2.3 The pattern of MSDs pain(s) in the different body parts

The pattern of MSDs pain(s) in the different body parts is shown in figure 12 below.

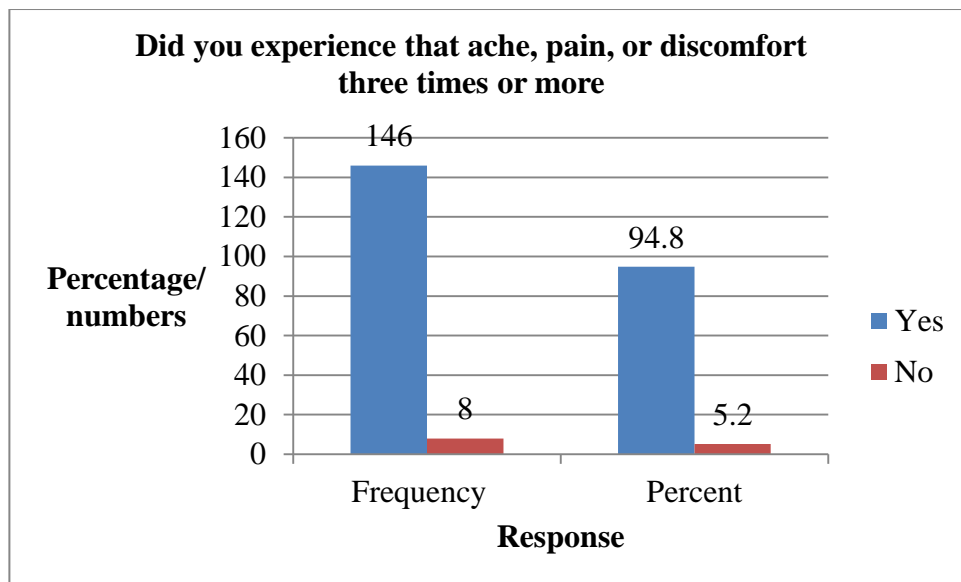


Figure 12: Study respondents who had trouble ache, pain, or discomfort in any part of their body in the last 12 months 3 times or more (n=197)

Of all the 154 respondents who reported that they had MSDs in the past 12 months, 94.8% of respondents had trouble ache, pain, or discomfort in any part of their body in the last 12 months 3 times or more. Only 5.2% of respondents indicated that they have not experienced trouble ache, pain, or discomfort in any part of their body in the last 12 months 3 times or more.

The recurring of MSDs symptoms such as trouble ache, pain, or discomfort in any body part in the last 12 months 3 times or more is the sign that MSDs was persisting and/ or occurring (3,26,61). It thus supports the findings of this study that nurses at KIH were really experiencing and suffering from MSDs.

4.2.3 RISK FACTORS CONTRIBUTING TO THE DEVELOPMENT OF MSDS AMONG NURSES

Respondents who experienced ache, pain or discomfort in the past 12 months had to indicate the risk factors that might have contributed to the development of MSDs.

The results pertaining to respondents' perception on the risk factors (being work-related or individual-related risk factors) that could contribute to the development of MSDs among them (nurses) is shown in figure 13.

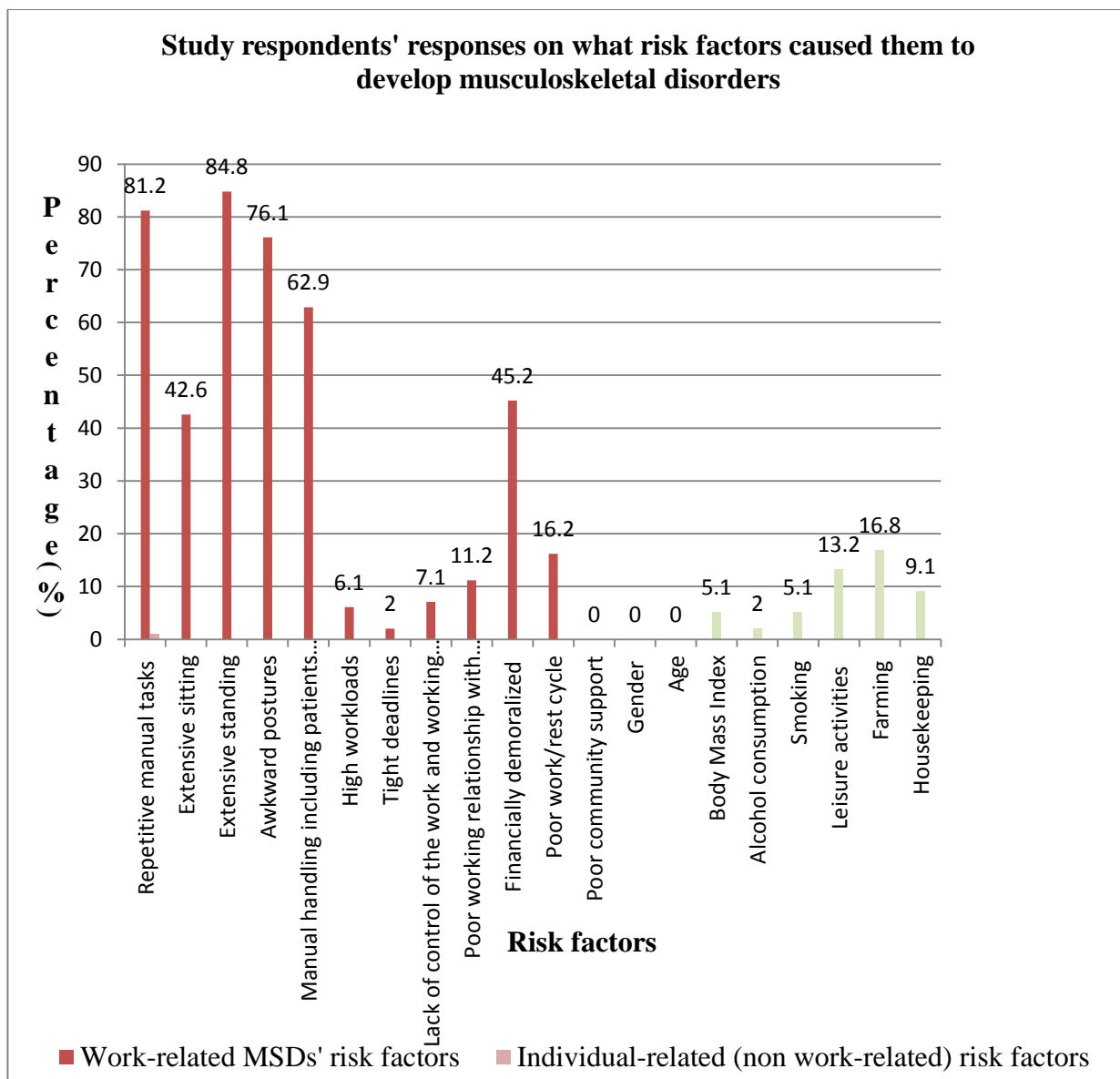


Figure 13: Respondents' perceptions on the risk factors (work related and non-work related) that might contribute to the development of MSDs (n=197)

The respondents who experienced MSDs in the last 12 months have indicated that work-related risk factors were the main factors causing the development of MSDs. This was signified when study respondents indicated that extensive standing (84.8%), repetitive manual tasks (81.2%), awkward posture (76.1%), and manual handling, including

patient handling, (62.9%) were the leading physical risk factors. Respondents also indicated that being financially demoralised (45.2%) contributed to the development of MSDs. The results related to individual risk factors, indicated farming activities (16.8%) as the highest risk factor, while alcohol consumption was the least (2%).

Studies indicated that various risk factors can contribute to MSDs, whether being work-related and/ or individual-related risk factors (8, 26, 27).

The chi-square was then calculated and/ or determined for the p-value, (using Epi Info™ version 7 databases and statistics programme), to determine if there was association between risk factors and the development of MSDs among nurses. These results are shown in table 1.

Table 1: Relationship between risk factors and the development of MSDs among all respondents

Risk factors contributing to the development of musculoskeletal disorders	P values
Work-related risk factors	
Repetitive manual tasks	0.001
Extensive sitting	< 0.001
Extensive standing	0.004
Awkward postures	< 0.001

Manual handling including patients handling	0.001
High workloads	< 0.001
Tight deadlines	< 0.001
Lack of control of the work and working methods	0.002
Poor working relationship with supervisors and colleagues	< 0.001
Financially demoralized	< 0.001
Poor work/rest cycle	< 0.001
Poor community support	1.000
Individual-related risk factors	
Gender	1.000
Age	1.000
Body Mass Index	< 0.001
Alcohol consumption	0.002
Smoking	< 0.001
Leisure activities	< 0.001
Farming	< 0.001
Housekeeping	< 0.001

The obtained p-values of work-related risk factor were; repetitive manual tasks 0.001, extensive sitting < 0.001 , extensive standing 0.004, awkward postures < 0.001 , and manual handling including patients handling 0.001. The obtained p-values < 0.05 indicated a strong association between the risk factors and the development of MSDs among nurses at KIH.

Work-related risk factors were thus the main risk factors contributing to the development of MSDS among the study respondents. This study findings are consistent with previous studies which indicated that extensive standing, repetitive manual tasks, awkward posture, and manual handling including patient handling are common work-related risk factors contributing to the development of MSDs among nurses (16,24,48). A study conducted on MSDs among nurses at the National Referral Hospital, Mulago in Uganda, determined that the development of MSDs among nurses from that hospital, was associated mainly with work-related risk factors with the p-value < 0.05 (40).

A similar study conducted on MSDs' risk factors among nurses in a tertiary hospital in India, indicated that working in the same position for long period (37.10%), working in awkward and cramped position (29.20%), and performing the same task over and over (29%), were the most work-related risk factors among all study respondents (10). In a similar study on MSDs' risk factors among nurses working at Ibadan, a higher prevalence of MSDs among nurses were due to physical work demand, and organizational factors (9).

Study respondents have indicated that work-related risk factors (physical risk factors) may contribute to higher prevalence of MSDs in the lower back, neck, shoulder and one or both ankles/feet among them (nurses) at KIH. Similar studies have indicated that lifting patients in bed, transferring patients out of bed, and lifting from the floor were the job activities most commonly reported as main sources of back pain among nurses (3,19). In a similar study in Southampton, United Kingdom, indicated that neck and shoulder pain was associated to physical exposure including patient handling at work, and stress, and psychosocial factors were not with any incident of back, neck or shoulder pain (52).

Nurses working in Katutura Intermediate Hospital are understaffed and overloaded with hospital work (32,33), since nurses have to attend to patients that might sometimes be more than the accommodating capacity of the hospital (1). This could result in an increase in prolonged standing, sitting, applying repetitive movements, manual handling, and stress.

A similar study conducted to assess the causes of low back, neck and shoulder pain, aches and discomfort, have indicated that back pain occurred after prolonged standing, neck pain occurred after prolonged sitting, and shoulder pain occurred after being exposed to work that required lifting heavy load overhead, repetition of certain movement, and working at awkward posture (52).

Individual-related risk factors are most common in female nurses, because they are likely to do after work responsibilities like parenting, undertaking domestic loads, insufficient rest time and lack of exercise (57). However, the study respondents in this

study have shown no significant contribution of individual-related risk factors to the development of MSDs'. Only 16.8% of the total respondents agreed that MSDs could be caused by farming. Yet, the obtained p-values indicate that there is an association between body mass index, smoking, leisure activities, farming and housekeeping, as individual-related risk factors, and the development of MSDs, except for gender and age.

Even though the results reflected an association between both groups of risk-factors and the development of MSDs (p-value <0.05), the responses of the study respondents indicated that work-related risk factors are the most contributing risk factors for the development of MSDs. Thus, it is concluded that the MSDs among nurses at KIH are contributed by work-related risk factors.

4.2.4 THE IMPACT OF MUSCULOSKELETAL DISORDERS AMONG NURSES AT KATUTURA INTERMEDIATE HOSPITAL

The impact of MSDs on nurses is shown in figure 14.

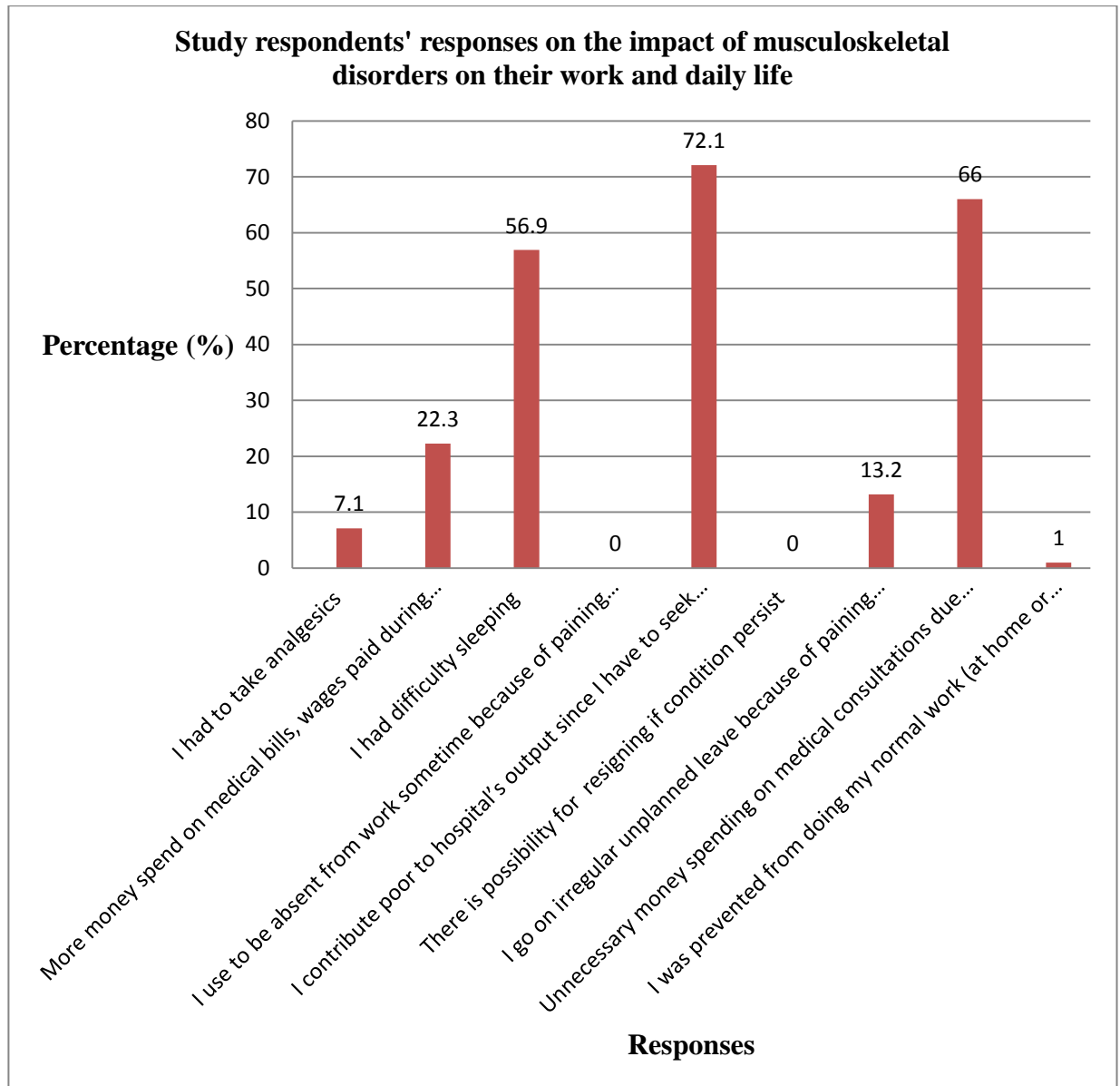


Figure 14: Percentage indicating respondents' perceptions on what impact MSDs might have among all participants (n=197)

The respondents who experienced MSDs in the past 12 months indicated that the most severe impact MSDs had on them, is that they contribute poorly to hospital's output, since they have to seek for medical attention instead of attending to patients (72.1%). Other impact were unnecessary money spending on medical consultations due to MSDs (66%), as well as having difficulty sleeping (56.9%), and more money spend on medical bills, wages paid during absence and on workers' insurance funds due to MSDs (22.3%).

Additional impact of MSDs respondents experienced were irregular unplanned leave because of pain condition of MSDs (13.2%), taking analgesics (7.1%), while other were prevented from doing their normal work, (at home or away from home), because of the pain trouble in the past 12 months (1%).

Globally, MSDs are known to have a higher impact among health care workers, with the nursing population constituting about 33%, because of the nature of their work that make them more prone to the development of MSDs (20).

Similar studies on the impact of MSDs among nurses, conducted all over the world, including Africa where Namibia is situated, have indicated that some of the most common impact of MSDs among nurses are, unnecessary money spending on medical consultations due to MSDs, nurses having difficulty sleeping, more money spend on medical bills, wages paid during absence and on workers' insurance funds due to MSDs, possible low productivity as few patient will be attended to, since nurses have to seek for medical attention instead (6, 8, 25, 36–38).

Studies have shown that MSDs is the most expensive form of work disability (10). A study conducted on the impact of MSDs among nurses in India have shown that MSDs

are one of the major occupational health problems in India and about 40% of medical costs is spent on treatment thereof (10). Nurses developing acute and cumulative MSDs is an impact of MSDs which is life threatening and unhealthy to experience and/ or suffer from such disorders (61). MSDs also result in incapacitation, poor performance and productivity at work (40,45,61). Incapacitation leads to work absenteeism and workload constraints which bear on the low nurse to patient ratio ultimately affecting quality of patient care (40). MSDs pain on different body parts have a major negative impact on nurses' performance, because pains make work or functional tasks difficult (3). Poor patient outcomes, work demoralisation, early retirement among nurses are also the impact of MSDs among nurses (40).

This supports this study finding that nurses perform poorly in the output of the hospital, because they have to seek medical attention to treat pains instead.

Other studies on the impact of MSDs among nurses, also indicated the following impact of MSDs: nurses taking leave due to work overload, lost working time since nurses are prevented from doing their normal work because of MSDs pains, and some nurses have to taking analgesics (6, 8, 25, 36–38). Nurses are likely to go on irregular unplanned leave because of MSDs pains (6,42,61), while it also affect the work attendance of nurses, ranging from five up to 30 days of work (19, 63).

MSDs can also impact nurses' quality of life, cause lost working time, cause absenteeism, nurses transfer to another job, cause disability among nurses and, cause huge economic toll on the individuals (6,42,61).

This study finding on the impact of MSDs experienced among nurses at KIH, are thus consistent with other studies.

4.4 SUMMARY

This chapter presented and illustrated, using graphs and tables, the study findings and discussions which entails information on prevalence, risk factors, and impact of MSDs among nurses at KIH. Descriptive-analytic statistics were used. The prevalence rate of MSDs over a 12 month period, in any body part was 78.2%, with low back pain, indicated as the main body part affected. Work-related physical risk factors were the main factors contributing to the development of MSDs' among nurses. The main impact of MSDs among nurses at KIH, was that nurses contribute poorly to hospital's output, since they have to seek for medical attention instead of attending to patients (72.1%)

The next chapter will cover conclusions, recommendations, and the limitations of the study.

CHAPTER 5

CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

5.1 INTRODUCTION

In this chapter the conclusions and recommendations emanating from the findings of this study are given. The possible limitations encountered in this study are also given.

The purpose of the study was to investigate the prevalence, risk factors and impact of musculoskeletal disorders among nurses at Katutura Intermediate Hospital in khomas region in Namibia.

The specific objectives of the study were to:

- Determine and describe the prevalence of musculoskeletal disorders among nurses at Katutura Intermediate Hospital
- Identify and determine the categories of risk factors that cause musculoskeletal disorders among nurses at Katutura Intermediate Hospital
- Determine and describe the impact of musculoskeletal disorders among nurses at Katutura Intermediate Hospital

5.2 CONCLUSIONS

The conclusions for this study are based and linked to the specific objectives.

Objective 1: To determine and describe the prevalence of musculoskeletal disorders among nurses at Katutura Intermediate Hospital

The musculoskeletal disorders (MSDs) among nursing personnel at KISH are a major occupational health problem, with prevalence rate of MSDs at any body region to be 78.2%. The MSD sites reported to be mostly affected was low back pain.

Objective 2: To identify and determine the categories of risk factors that cause musculoskeletal disorders among nurses at Katutura Intermediate Hospital

Most study respondents reported work-related risk factors as the main factors contributing to the development of MSDs. The calculated p-value (<0.05) indicated that both work-related and individual risk factors have a strong association to the development of MSDs among nurse.

Objective 3: To determine and describe the impact of musculoskeletal disorders among nurses at Katutura Intermediate Hospital

The MSDs are impacting nurses' work and daily life. The main impact of MSDs is that nurses contribute poorly to the output of the hospital, since they have to seek for medical attention instead of attending to patients.

5.3 RECOMMENDATIONS

The following recommendations are made based on the results and conclusions of the study.

5.3.1 Recommendations to KIH

- Prevalence of MSDs' among nurses: Any nurse reported to suffer from MSDs need to be recorded as a specific type of MSD in the Health Information System (HIS). This will enable the health institution to have proper records of any MSDs, determine trends of such disorders with the aim of developing occupational health and safety programmes at the work place.
- Risk factors contributing to MSDs' development: Educational and awareness programmes on MSDs to be introduced, and sustained with the aim of increasing knowledge about MSDs prevention, and prevention of exposure to work-related risk factors.
- Impact of MSDs among nurses: It is strongly recommended that attention should be given to the scientific determination of work load to calculate adequate staffing.

5.3.2 Recommendations for health care workers/nurses

- Risk factors contributing to MSDs' development: Health care workers/nurses are encouraged to fully participate and sustain educational and awareness programmes on MSDs, if it get introduced, in order to increase knowledge about MSDs prevention, and prevention of exposure to work-related risk factors among health care workers/nurses.

5.3.4 Recommendations for MoHSS

- Risk factors contributing to MSDs' development: Educational and awareness programmes on MSDs to be introduced, and sustained with the aim of increasing knowledge about MSDs prevention, and prevention of exposure to work-related risk factors.
- Impact of MSDs among nurses: It is strongly recommended that attention should be given to the scientific determination of work load to calculate adequate staffing.

5.4 FURTHER RESEARCH

- There is great need to conduct similar studies in other health institutions to gain insight on prevalence of MSDs among nurses in Namibia.

5.5 LIMITATIONS

There were no limitations experienced in the study.

5.6 SUMMARY

This chapter presented the information about the conclusion, recommendations, and the possible study limitations. All objectives were addressed. Findings revealed prevalence rate of MSDs over a 12 month period, in any body part was 78.2%, with low back pain, indicated as the main body part affected. The work-related risk factors are the main factors that contribute to the development of MSDs among nurses. The MSDs have negative impacts to nurses' daily life and work, with nurses poorly contributing to the outputs of the hospital as a result of MSDs. It is recommended that surveillance, educational and awareness programmes on MSDs to be maintained, with the aim of

increasing knowledge about MSDs prevention, and prevention on exposure to the work-related risk factors. Reducing MSDs among nurses will improve productivity in their work and improves their quality of life.

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APPENDICES

Appendix A: University of Namibia research permission letter

CENTRE FOR POSTGRADUATE STUDIES

University of Namibia, Private Bag 13301, Windhoek, Namibia
340 Mandume Ndemufayo Avenue, Pioneers Park
☎ +264 61 206 3275/4662, Fax +264 61 206 3290; URL: <http://www.unam.edu.na>



RESEARCH PERMISSION LETTER

Student Name: A Akweetela

Student number: 2001118416

Programme: MPH

Approved research title: Investigation of the prevalence, risk factors and impacts of Musculoskeletal disorders among nurses at Katutura Intermediate Hospital, Khomas Region

TO WHOM IT MAY CONCERN

I hereby confirm that the above mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees.

The proposal adheres to ethical principles as per attached Ethical Clearance Certificate. Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards

A handwritten signature in dark ink, appearing to read "Marius Hedimbi", is written over a horizontal dashed line.

Name: Dr Marius Hedimbi

Director: Centre for Postgraduate Studies

Tel: +264 61 2063275

E-mail: directorpgs@unam.na

13 Dec 17

Date

Appendix B: Ministry of Health and Social Services research permission letter



REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198
Windhoek
Namibia

Ministerial Building
Harvey Street
Windhoek

Tel: 061 – 2032537
Fax: 061 – 222558
Email: shimenghipangelwa71@gmail.com

OFFICE OF THE PERMANENT SECRETARY

Ref: 18/3/3 AA

Enquiries: Mr. J. Nghipangelwa

Date 19 January 2018

Mr. Ananias Akweetelela
University of Namibia
Windhoek
Namibia

Dear Mr. Akweetelela

RE: Investigation of the prevalence, risk factors and impacts of musculoskeletal disorders among nurses at Katutura Intermediate Hospital, Khomas Region.

1. Reference is made to your application to conduct the above-mentioned study.
2. The proposal has been evaluated and found to have merit.
3. **Kindly be informed that permission to conduct the study has been granted under the following conditions:**
 - 3.1 The data to be collected must only be used for academic purposes;
 - 3.2 No other data should be collected other than the data stated in the proposal;
 - 3.3 Stipulated ethical considerations in the protocol related to the protection of Human Subjects' should be observed and adhered to, any violation thereof will lead to termination of the study at any stage;
 - 3.4 A quarterly report to be submitted to the Ministry's Research Unit;
 - 3.5 Preliminary findings to be submitted upon completion of the study;

3.6 Final report to be submitted upon completion of the study;

3.7 Separate permission should be sought from the Ministry of Health and Social Services for the publication of the findings.

Yours sincerely,

M. P. Masabane
Ms. P Masabane
Acting Permanent Secretary



Appendix C: Katutura Intermediate Hospital research permission letter



Republic of Namibia

Ministry of Health and Social Services

Private Bag 13215
WINDHOEK
Namibia

Intermediate Hospital Katutura
Independence Avenue
WINDHOEK

Telephone (061) 203 4004/5
Telefax (061) 222706

Enquiries: Dr. F. M. Shiweda

Date: 03 March 2018

OFFICE OF THE MEDICAL SUPERINTENDENT

Mr. Ananias Akweetelela
University of Namibia
Windhoek
Namibia

Dear Mr. A. Akweetelela


RE: INVESTIGATION OF THE PREVALENCE, RISK FACTORS AND IMPACTS OF
MUSCULOSKELETAL DISORDERS AMONG NURSES AT KATUTURA
INTERMEDIATE HOSPITAL, KHOMAS REGION.

The above mentioned subject refers:

This office hereby grants you permission to do an investigation of the prevalence, risk factors and impacts of musculoskeletal disorders among nurses at Katutura State Hospital, Khomas Region, MoHSS.

Thank you

Yours in health,


DR. F. M. SHIWEDA
CHIEF MEDICAL OFFICER



Appendix D: Questionnaire

Student name: Ananias Akweetelela

Main supervisor: Dr. Hermine Iita

Co-supervisor: Ms Lucille Van Der Westhuizen

QUESTIONNAIRE

Dear respondent

This questionnaire will be used for a research project on: INVESTIGATION OF THE PREVALENCE, RISK FACTORS AND IMPACT OF MUSCULOSKELETAL DISORDERS AMONG NURSES AT KATUTURA INTERMEDIATE HOSPITAL, KHOMAS REGION. This questionnaire will only be used for academic purpose only and information will be treated with greatest confidential. The participation to this study is voluntary, and all ethical considerations are strongly adhered to. Your assistance in completing this questionnaire would be greatly appreciated.

Kindly sign and put the date below. Thank you.

Signature.....Date..... **Participant number**

INSTRUCTIONS

Tick (✓) in the appropriate box, and specify answer(s) where applicable by filling in the space provided.

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

1. Gender

- a) Male ☐ ☐ b) Female ☐

2. Age

- a) Less than 30 years ☐ b) 30–35 years ☐ c) 35–40 years ☐ d) More than 40 years ☐

3. Body-mass index kg/m²

- a) <18.5 ☐ b) 18.5–24.9 ☐ c) 25–29.9 ☐ d) 30 or greater ☐

4. Years of employment:

- a) 1- 1year and months ☐ b) 2-3 ☐ c) 4-5 ☐ d) 6 or more ☐

5. Tick the department you are currently working for in?

- | | | | |
|---------------------|--------------------------|---------------------|--------------------------|
| a) Medical ward | <input type="checkbox"/> | b) Surgical ward | <input type="checkbox"/> |
| c) Orthopaedic ward | <input type="checkbox"/> | d) Gynaecology ward | <input type="checkbox"/> |
| e) Paediatric ward | <input type="checkbox"/> | f) Acute care | <input type="checkbox"/> |
| g) Head injury | <input type="checkbox"/> | h) Stroke unit | <input type="checkbox"/> |
| i) Maternity | <input type="checkbox"/> | j) Casualty | <input type="checkbox"/> |
| k) ICU | <input type="checkbox"/> | l) Main theatre | <input type="checkbox"/> |
| m) TB | <input type="checkbox"/> | | |

6. How often do you rotate from one department to the other?

- a) Daily ☐ b) Weekly ☐ c) Monthly ☐ d) Annually ☐ e) Never ☐

7. Indicate how long you have been working in that department (only applicable to those who never do job-rotation)

a) 1 year []

b) Worked there since my deployment []

8. Apart from the normal 40 working hours per week, indicates the numbers of average working overtime hours per week that might add to your normal working hours per week

a) 4 hours/week []

b) 5-8 hours/week []

c) 9-11 hours/week []

d) 12 hour/week or more []

9. What is the most average day off duty you use to get per week?

a) 1 day off/week []

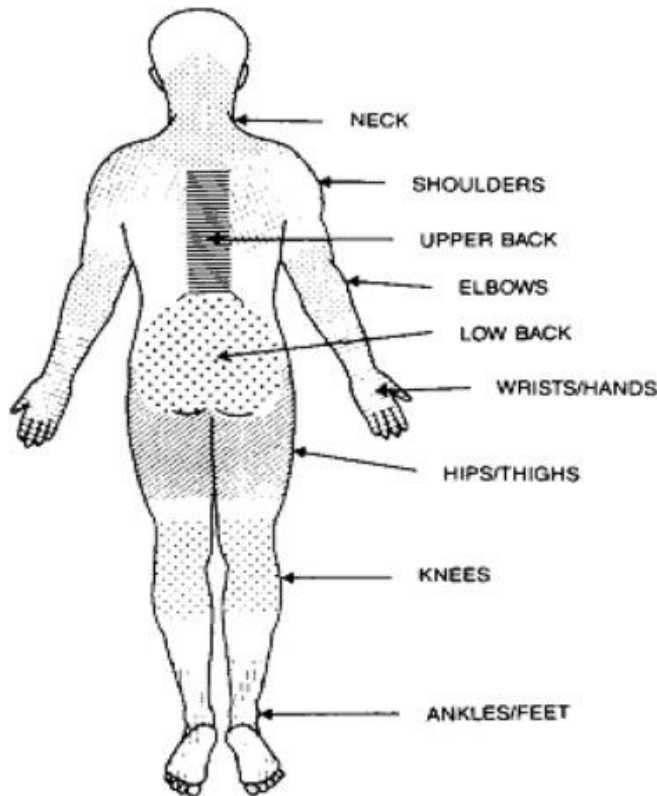
b) 2 days off/week []

c) 3 days off/week []

d) 4 days off/week []

SECTION B: PREVALENCE OF MUSCULOSKELETAL DISORDERS

The following picture 1 shows the approximate position of the human body parts that are referred to in the questions below, to answer questions on prevalence, and impact of MSDs.



Picture 1: position of body parts (13).

10. Have you ever had trouble (ache, pain, or discomfort) in any part of the body in the past 12 months?	11. Over the last 12 months, did you experience trouble (ache, pain, or discomfort) in body parts 3 times or more?
a) No <input type="checkbox"/>	a) No <input type="checkbox"/>
b) Yes <input type="checkbox"/>	b) Yes <input type="checkbox"/>

Please tick all parts that you ever had trouble with, (ache, pain, or discomfort), in the past 12 months	If yes, please specify in the specific appropriate box below, for each specified body part
Body parts	Rate of recurrence of trouble (ache, pain, or discomfort) of body parts
Neck <input type="checkbox"/>	a) Every day <input type="checkbox"/> b) Once a week <input type="checkbox"/> c) After some months <input type="checkbox"/>
Shoulder <input type="checkbox"/>	a) Every day <input type="checkbox"/> b) Once a week <input type="checkbox"/> c) After some months <input type="checkbox"/>
Elbow <input type="checkbox"/>	a) Every day <input type="checkbox"/> b) Once a week <input type="checkbox"/> c) After some months <input type="checkbox"/>
Wrist/hand <input type="checkbox"/>	a) Every day <input type="checkbox"/> b) Once a week <input type="checkbox"/> c) After some months <input type="checkbox"/>

Upper back []	a) Every day [] b) Once a week [] c) After some months []
Lower back []	a) Every day [] b) Once a week [] c) After some months []
One or both hips/ thigh/buttock []	a) Every day [] b) Once a week [] c) After some months []
One or both knees []	a) Every day [] b) Once a week [] c) After some months []
One or both ankles/feet []	a) Every day [] b) Once a week [] c) After some months []

12. Apart from any experienced trouble (ache, pain, or discomfort) in any part of the body listed above, do you have any diagnosed and recorded musculoskeletal disease/condition in the past 12 months?

a) Yes ☐

b) No ☐

13. If yes, please specify by choosing any of the musculoskeletal disease/condition indicated below. You are free to choose more than one disease/condition

a) Arthritis ☐

b) Muscle / Tendon strain ☐

c) Mechanical Back Syndrome ☐

d) Neuritis ☐

e) Calcaneal spur ☐

f) Osteoarthritis ☐

g) Tendinitis ☐

h) Ligament Sprain ☐

i) Fibromyalgia ☐

j) Epicondylitis ☐

k) Trigger Finger / Thumb ☐

l) DeQuervain's Syndrome ☐

m) Degenerative Disc Disease ☐

n) Carpal tunnel syndrome ☐

o) Bone fractures ☐

- p) Thoracic Outlet Compression []
- q) Radial Tunnel Syndrome []
- r) Tension Neck Syndrome []
- s) Ruptured / Herniated Disc []

SECTION C

RISK FACTORS CONTRIBUTING TO THE DEVELOPMENT OF MUSCULOSKELETAL DISORDERS

Only study participants who ever had trouble with, (ache, pain, or discomfort) in any part of their body in the past 12 months can answer section C.

Which group of risk factors do you think have contributed to your development of musculoskeletal disorders? You are allowed to choose more than one group and/ or risk factors

14. Work-related (ergonomic) risk factors

14.1. Physical Risk Factors

- Repetitive manual tasks []
- Extensive sitting []
- Extensive standing []
- Awkward postures []
- Manual handling including patients handling []

14.2 Job content risk factors

- High workloads []
- Tight deadlines []
- Lack of control of the work and working methods []

14.3 Organisational characteristics risk factors

- Poor working relationship with supervisors and colleagues []
- Financially demoralized []
- Poor work/rest cycle []
- Poor community support []

15. Individual-related risk factors

15.1 The individual factors (demography)

- Gender []
- Age []
- Body Mass Index []

15.2 Individual factors (lifestyle, including social context and factors related to external work environment)

- Alcohol consumption []
- Smoking []
- Leisure activities []
- Farming []
- Housekeeping []

SECTION D

THE IMPACTS OF MUSCULOSKELETAL DISORDERS

If you ever had trouble with, (ache, pain, or discomfort) in any part of the body in the past 12 months, kindly answer the following questions below.

16. How did these troubles with, (ache, pain, or discomfort) affected your work and your daily life?

- a) I had to take analgesics []
- b) More money spend on medical bills, wages paid during absence and on workers' insurance funds due to MSDs []
- c) I had difficulty sleeping []
- d) I use to be absent from work sometimes, because of pain condition (lost work time) []
- e) I sometimes had to seek for medical attention instead of attending to patients []
- f) There is possibility for resigning if condition persist []
- g) I go on irregular unplanned leave because of pain condition of MSDs []
- h) Unnecessary money spending on medical consultations due to MSDs []
- i) I was prevented from doing my normal work (at home or away from home) because of the pain trouble in the past 12 months []
- j) Others.....please specify []